A Database Publication

ATARI USER

Vol. 2 No. 11 March 1987 £1

Inside this issue



Gamble away – on our fantastic fruit machine



Super new graphics routines

At last – Pascal on your Atari

All the latest games reviews

Build your own voice-activated joystick

YOU NEED A GOOD

TO BUY FROM

WITH OUR LOW PRICES YOU'LL BE

The Leading UK Atari Hardware Supplier

ALL PRICES INC. VAT AT 15%
PRICES and DELIVERY SUBJECT TO AVAILABILITY



130 XE

ATARI COMPUTER

- Massive 128K Memory
- Superb Graphics, Colour & Sound
- 1000's of Software Titles available
- Wide range of Peripherals
- FREE Miner 2049'er cartridge

EXCELLENT COMPUMART VALUE ONLY...

£95.00 +£3p&p



1027

ATARI LETTER QUALITY PRINTER

- True Typewriter Quality print
- Prints at 20 Characters per Second
- Bi-Directional printing
- Full 80 Column width
- Built-in Interface, plug straight in & go

EXCELLENT VALUE ONLY...

£125.00 +£3p&p

FREE 'Atariwriter Plus' word pro'disk WORTH £40

How to Order...

Simply post your order stating: Name and Full Address, with either a Cheque or Postal Order (Made payable to Compumart) to the address opposite.

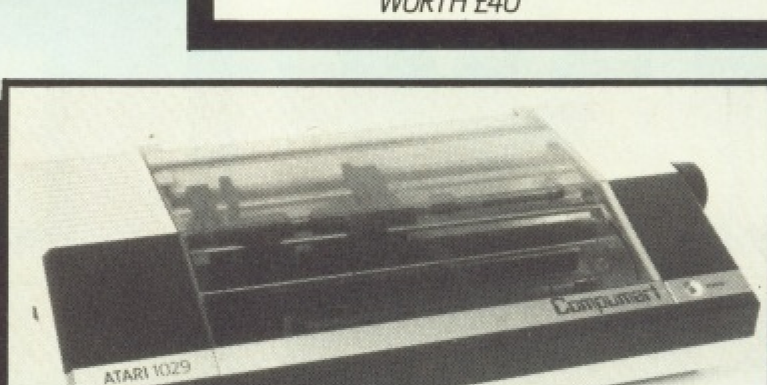
Phone any of our 3 Order Lines (24 Hours) and place your order using your Credit Card.

All Disks are usually despatched SAME DAY by First Class Post. Hardware by Parcel Post.

For a SPEEDY, NEXT DAY Securicor Delivery, just add £2 to Postage (e.g. £3 p&p, add £2 . . . Send £5)

Overseas Orders: Please deduct 15% (VAT), then add 10% (for Air Mail and Insurance).

We accept Official Purchase Orders from Government and Educational Establishments.



1029

ATARI DOT MATRIX PRINTER

- Uses Fanfold AND Single Sheet paper
- Fully adjustable paper Feeder
- Ideal for:- Draft Letters, Graphics & Prog. Listings
- Fast 50 Characters per Second printing
- Built-in Interface, plug straight in & go

EXCELLENT COMPUMART VALUE ONLY...

£125.00 +£3p&p

FREE 'Atariwriter' word processing disk ONLY FROM COMPUMART

SPECIAL OFFER While Stocks Last

'Atariwriter Plus' Word Processor Disk - Many new features over Atariwriter - 1/2 PRICE

ONLY... **£19.95** post FREE!

SENSE OF HUMOUR
COMPUMART...
LAUGHING ALL THE WAY TO THE BANK!

1050



ATARI DISK DRIVE

- Store/Retrieve Data in seconds
- Plugs straight into your Computer
- Massive 127K Data per side of 5¼" Disk
- Compatible with all Atari 8Bit Computers
- FREE Software pack included

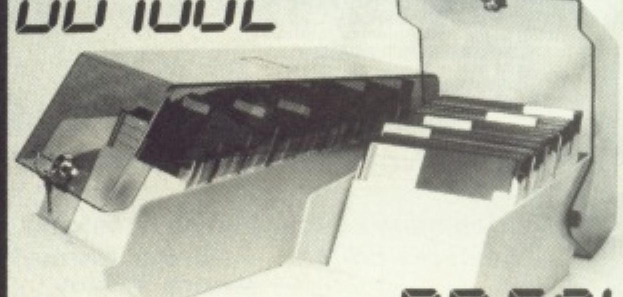
EXCELLENT VALUE ONLY... **£125.00** +£3p&p

PLUS 10 Blank Disks FREE
ONLY FROM COMPUMART

FULL RANGE OF SOFTWARE + PERIPHERALS **Always Available**

NEW... LOWER PRICES

DD 100L



DD 50L

'BOX CLEVER'

When it comes to 'boxing' you'll find ours' a KNOCKOUT!
Excellent quality Perspex, lockable, with dividers & non-slip rubber feet

DD 50L-Holds 50 ONLY... **£7.95**
DD 100L-Holds 100 ONLY... **£10.95**
POST FREE

for 5¼" Disks

5¼" BLANK DISKS

10	SS~£5.95 +£1P&P	DS~£7.95 +£1P&P	FREE Plastic Case per 10
50	SS~£29.95 +£2P&P	DS~£39.95 +£2P&P	FREE Lockable Storage Box per 50
100	SS~£49.95 +£2P&P	DS~£59.95 +£2P&P	Strong card boxes in Tens

SAVE UP TO 25%

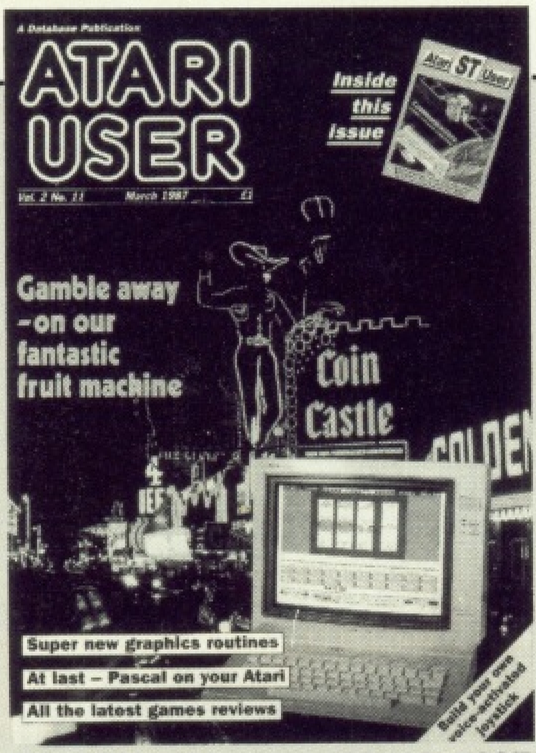
Top Quality ~ Fully Guaranteed
Individually Certified - Envelopes -Labels -Write Protect Labels etc....

ALL Products are covered by the Compumart Guarantee!

Compumart
A GREAT DEAL MORE · FOR A GOOD DEAL LESS!

3 ORDER LINES (OPEN FOR 24 HOURS)
(0509) 262259 233893 266322

Please Send Cheques/P.O.'s to...
COMPUMART-Dept AU-Unit 8-Falcon Street Loughborough - Leics - LE11 1EH



Vol. 2 No. 11 March 1987

Managing Editor: **Derek Meakin**
Features Editors: **Andrew Bennett, André Willey**
Production Editor: **Peter Glover**
Art Editor: **Heather Sheldrick**
Reviews Editor **Christopher Payne**
News Editor: **Mike Cowley**
Advertisement Manager: **John Riding**
Advertising Sales: **John Snowden**

Editorial: **061-456 8835**
Administration: **061-456 8383**
Advertising: **061-456 8500**
Subscriptions: **061-480 0173**
Telecom Gold: **72:MAG001**
Telex: **265871 MONREF G**
Quoting Ref. 72:MAG001
Prestel Mailbox: **614568383**

Published by:
Database Publications Ltd,
Europa House, 68 Chester Road,
Hazel Grove, Stockport SK7 5NY.

ABC 33,573 January-June, 1986

Subscription rates for
12 issues, post free:
£12 – UK
£15 – Europe
£30 – Overseas (Airmail)

"Atari User" welcomes program listings and articles for publication. Material should be typed or computer-printed, and preferably double-spaced. Program listings should be accompanied by cassette tape or disc. Please enclose stamped, self-addressed envelope, otherwise the return of material cannot be guaranteed. Contributions accepted for publication by Database Publications Ltd will be on an all-rights basis.

News trade distribution:
Europress Sales and Distribution Limited, Unit 1, Burgess Road, Ivyhouse Lane, Hastings, East Sussex TN35 4NR. Tel: 0424 430422.



Contents

Atari Show launch for new PC model

IT has now been confirmed that the April Atari Computer Show has been selected as the UK launch pad for the company's IBM PC compatible machine.

At the same time it was made official that the event has been chosen for the official unveiling of the revolutionary priced laser printer and the latest in the ST range – the Mega ST workstations.

Company officials had previously considered releasing all these breakthroughs at the Which? Computer Show.

However it was subsequently decided to hold over until the April event, so providing Atari users with the opportunity to see the machines first.

"We felt we owed it to our faithful army of Atari fans out there", said a company spokesman.

"This will transform the event into a never to be forgotten occasion".

Such is the importance now being placed on the show that chairman Jack Tramiel and a party of VIPs will be jetting across the Atlantic to attend.

But even long before it was known that there would be major launches at the show, demand from exhibitors had been at an all-time high.

And a large number of these are reported to be preparing to release further new products.

While most companies involved would not divulge details before the show, *Atari User* managed to unearth several who would.

On the ST front, Precision Software is to introduce a multi-file relational database. Known as Superbase Personal, it is designed for use with Gem and is likely to carry a price tag of around £100.

Highsoft also has a new package for the ST in the form



Atari boss Jack Tramiel will be there

of a basic compiler. Compatible with Microsoft Basic, the price has yet to be decided.

Nor will 8 bit users be overlooked. In fact it would appear that on the software front new titles for this range will overshadow those for the ST.

Red Rat Software has three new games – Asteroid, Death Racers and Forbidden Island – all costing £7.95 on tape, £9.95 on disc.

And on the budget title scene, Tynesoft will be offering a range under its new Micro Value label all priced at less than a £1.

"This show is shaping up to be the most significant event ever in the Atari calendar", says Derek Meakin, head of organisers Database Exhibitions.

The Atari Computer Show takes place at the Novotel, Hammersmith, London from April 24 to 26.

Doors open at 10am each day and close at 6pm on Friday and Saturday, 4pm Sunday.

A money saving advance ticket order form can be found on Page 53 of this issue of *Atari User*.

In-depth manuals plan

FULL operations manuals – many in excess of 100 pages – are now to be offered with the Atari 8 bit range of packages from MicroProse.

The in-depth publications are already the hallmark of the giant American software house's 16 bit simulations.

But in a move to strengthen its position as the market leader MicroProse will now issue the extensively researched booklets with its lower priced packages – including those costing just £9.95.

The glossy covered works contain not only detailed operational instructions, but also historical background information, notes from the designer and advice on further reading material on the subject.

"We pride ourselves on authentic and accurate simulations that provide not just a few hours of enjoyment but hundreds", says Stewart Bell, managing director of MicroProse in the UK.

"So that every player can get the most out of our simulations, we've decided to issue manuals with all our products".

65XE makes its bow

WITHIN 48 hours of Atari UK's new 8 bit level entry machine taking its bow, it attracted advance orders for 75,000 units.

Known as the 65XE, it was shipped from America to make its spectacular sales debut at the London Toy Fair.

In its basic form it is a games machine but can be upgraded to a 130XE compatible computer.

Offered in a grey case like the ST range, the 65XE is to be sold for £89.95, the price including a joystick and a games cartridge.

Interface

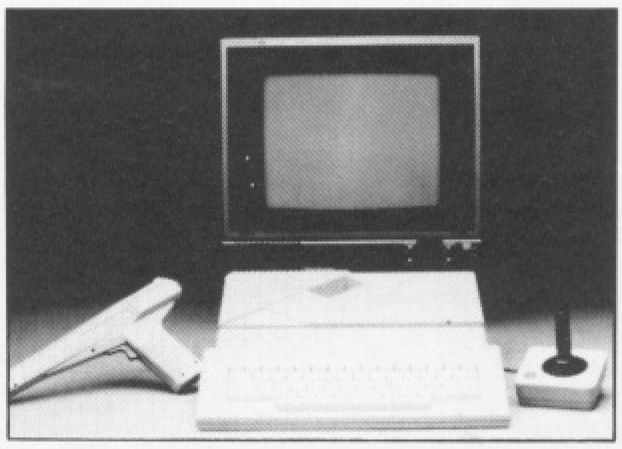
However it does not have a built-in cassette as previous reports from the States indicated, but simply a cassette interface.

The upgrade kit, which costs £40, adds a keyboard, lightgun and cassette recorder to convert it into a true 8 bit micro.

Atari had previously planned to replace the successful 2600VCS games machine over here with the 7800VCS.

However officials at Atari UK persuaded their American cousins that the British market would benefit from a machine that could run cassettes – not just cartridges as in the case of the 7800.

"We feel that this offers the users over here the best of both worlds", said an Atari spokesman.



The 65XE system includes keyboard, joystick and light pen



Roy Goring

Problem solving service

A HAMPSHIRE man has started running a correspondence course specially devised and priced for young Atari users who want to learn how to write programs.

Roy Goring bought an 800XL four years ago to teach himself Basic and machine code.

He is now an expert in Atari Basic and has devised his own style of structured programming which is simple to write and debug.

"My correspondence course is run on a very personal basis", Goring told *Atari User*. "Each lesson is tailored to the needs of the individual because no two people learn at the same speed.

"I sell only one lesson at a time – priced £2 – because this allows schoolchildren who follow the course to save up and buy each stage when they can afford it.

"I've also included a problem-solving service because when I was programming and got stuck I had no one to turn to for help.

"I deal with people's problems on a personal basis for a minimum fee of £1, rising in accordance with the amount of work I have to do in order to help them.

"Although my correspondence course is relatively new it has already proved popular".

Atari keeps eye on Parliament

A NEW publication which monitors Parliament's activities in relation to health is being produced with the aid of an Atari 1040STF.

Healthcare Parliamentary Monitor appears fortnightly while Parliament sits.

It aims to provide a non-partisan account of all health care developments at Westminster and at the DHSS.

The newsletter is distributed to companies and individuals with a specific interest in healthcare – health authority managers, family planning clinics, community health councils, pharmaceutical companies, pharmacists, medical equipment manufacturers and suppliers, and medical academics.

It covers debates in both Houses, parliamentary questions and answers, government and Private Members' Bills, and select committee meetings among other topics.

Editor Rodney Deitch told *Atari User:* "The most important criteria for me when I was evaluating different micro systems was to get the right balance between price and performance.

"The best value for money was definitely supplied by the Atari ST. It is important for me to upgrade the system shortly, and I am already looking into different desktop publishing packages as well as laser jet printers.

"I've found the ST indispensible in the task of putting the newsletter together. At the moment I'm using HabaWriter, HabaView and HabaMerge and find them extremely easy to use".



New option

ATARI 8 bit users have a new joystick option available to them – the Phasor One from Britannia Software.

Its design incorporates a pistol grip trigger action, with the joystick placed on top of the device to permit equal dexterity by both left and right handed users. Price £12.95.

Adventure for all

AMERICAN publisher Strategic Simulations has converted Phantasie for the Atari 8 bit machines and Phantasie II for the ST.

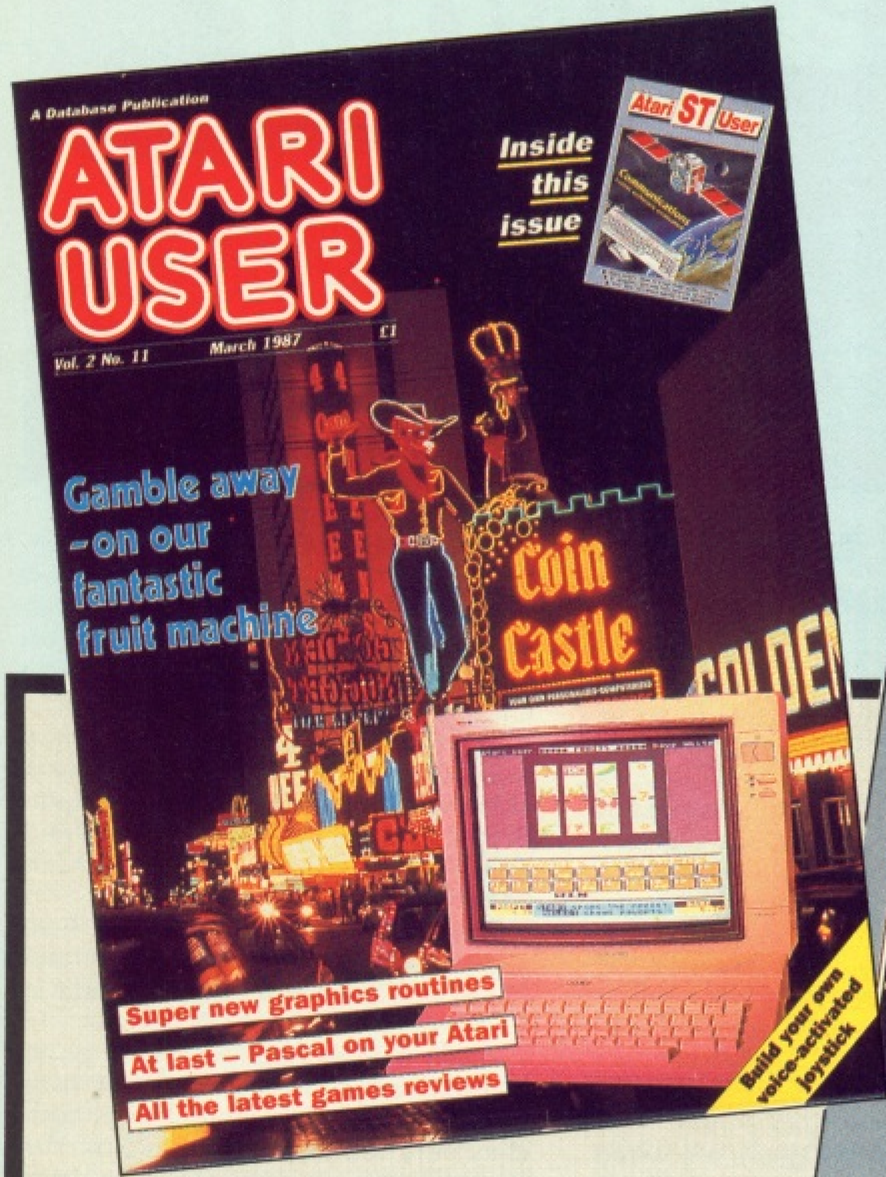
Phantasie is a multiple role-playing game where a party of up to six characters is assembled to search the Isle of Gelnor for nine rings that will rid the land of the Dark Lord.

Players can create an elf who is a wizard, a dwarf who is a fighter, or combine in creative ways the eight races and six classes of characters which include humans, elves, dwarves, thieves, warriors and wizards.

More than 80 types of monsters oppose the player in a total of 10 dungeons.

Phantasie II takes players to the Isle of Ferronrah, a place of beauty and magic beset by evil power from an enchanted orb controlled by Nikademus, the Dark Lord.

Players gather a group of adventurers to sail to the island, use spells and weapons to invade it, escape dungeons and destroy the demons.





The parting of the ways...

FOLLOWING an overwhelming reponse from our readers after the recent survey in *Atari User,* it has been decided that the magazine will say goodbye to its younger cousin – *Atari ST User* – which from now on will be published as a magazine in its own right.

Starting with the April issues, *Atari User* will return to being wholly aimed at owners of 8 bit Atari computers. There will be lots of room for more utilities, games listings and tutorial series.

Atari ST User will at least double in size and this extra space will allow us to support ST users better than ever before. Forthcoming features include detailed reviews of all the latest software and hardware and a major new series on Gem programming which will include details of everything from dialogs to windows.

Publishing two Atari magazines every month will allow us to give much greater coverage to all that's happening in the rapidly expanding world of Atari.

Whether you own an 8 bit, ST or both, we're sure that you will welcome both magazines and we look forward to your comments and suggestions on ways you would like to see them develop in the future.

● *To take out an annual subscription to Atari User or Atari ST User please use the subscription form on Page 53. If you are already a subscriber to Atari User and wish to transfer your subscription to Atari ST User, please write (giving the name and address to which we send the magazine) to: Subscriptions Dept, Atari User, Europa House, 68 Chester Road, Hazel Grove, Stockport SK7 5NY.*

Talk your Atari into action

Part 9 of LEN GOLDING's series on using your Atari to control devices

CURE those trigger-finger blisters by adding a voice-operated fire button to your favourite joystick. Astonish your friends with a talking head, whose lips move when you speak into a microphone.

Or keep track of vibration from any source – fridges, washing machines, TV speakers or even major earthquakes. Or just train your computer to do tricks when you whistle. This gadget can do it all.

Since you can trigger it by touch or by blowing gently across the mike, it could find a less frivolous use in Possum-type systems to help severely disabled people open curtains, answer the door or switch the TV on and off.

It can also be easily adapted to accept inputs other than sound, but more about that later.

You can't connect a microphone directly to the joystick port for two main reasons. Firstly, the output from most mikes is very small – a few thousandths of a volt at best – and the computer isn't sensitive enough to detect it. Secondly the signal is AC, which the internal hardware can't handle.

We need to amplify the mike's output and convert it into a DC signal which switches cleanly between 5V and 0V. Then it can be connected to any of the five on/off input lines on your joystick port.

Figure I shows the circuit. It's not the simplest possible design, but it is very versatile and costs only a few pence more than a rudimentary sound switch.

Stage 1 is a fairly conventional AC amplifier which converts the microphone output into a respectable voltage swing at C3.

Stage 2 is less conventional, built around an ordinary quad 2-input NOR gate chip. Two of the gates are wired as a monostable, which converts brief input pulses into output pulses long enough for the computer to detect.

The remaining two gates form a Schmidt trigger, which ensures a clean on/off transition at the output. Stage 2 is in fact a self-contained analogue-to-digital switch which behaves in the following way:

The input (point A) is normally held above 2.7V, by the action of VR1 and R5. In this state the output is held at +5V (logic 1).

When a brief negative-going pulse is received from C3, point A falls below 2.3V and the output then switches very rapidly to 0V (logic 0). The Schmidt trigger action ensures that

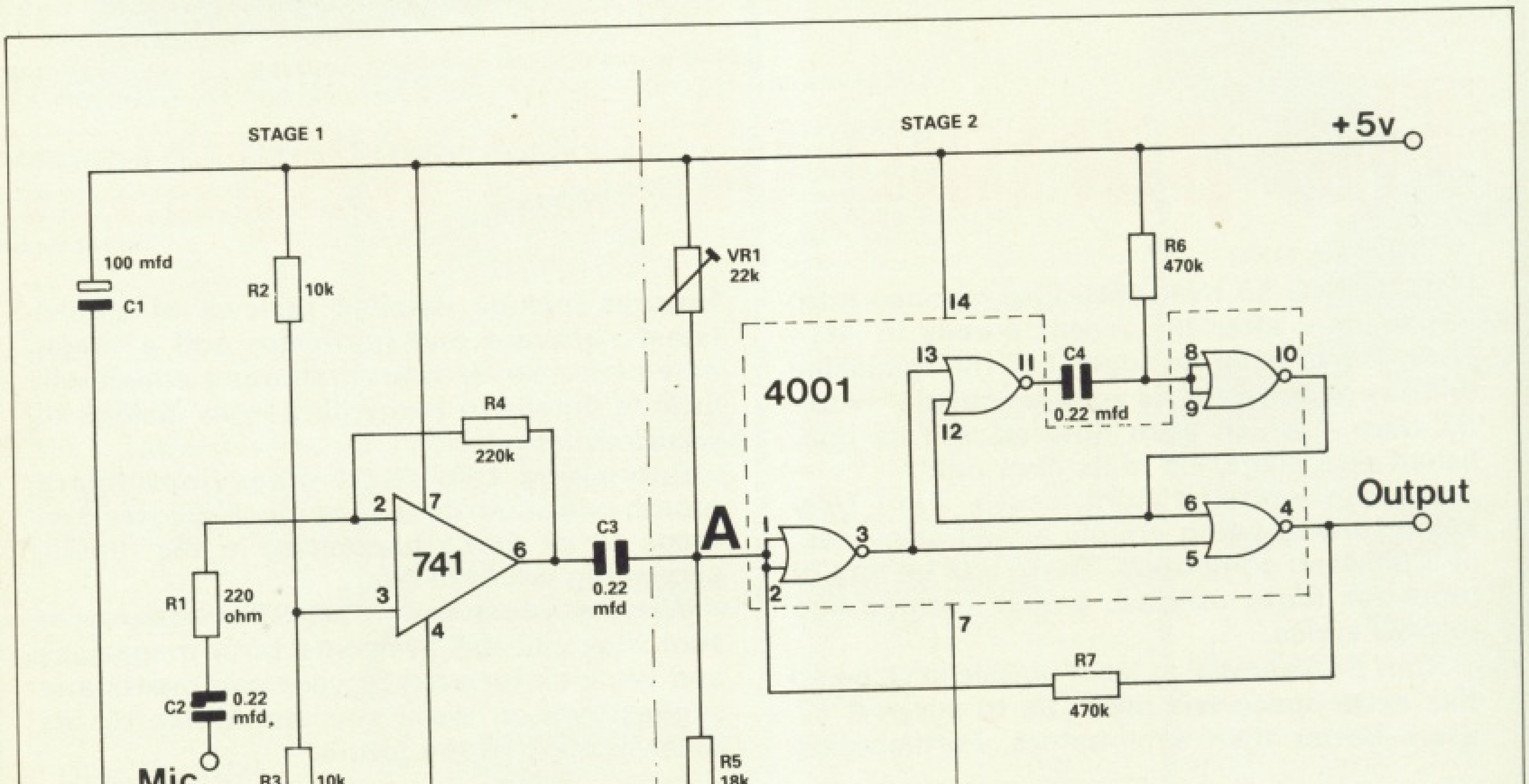


Figure I: Circuit diagram for the sound-activated switch

the gadget can't send out any intermediate voltage which might confuse the computer.

The monostable holds the output low for about one tenth of a second, no matter what happens at the input. If at the end of this period point A has gone back to 2.7V or more, the output returns to its high state.

Otherwise it remains low until the input voltage rises above the 2.7V threshold. This gap of 0.4V between rising and falling thresholds ensures that the output won't chatter on and off when the input is exactly at one or other of the trigger voltages.

Now let's look at practical construction. If you like to etch your own PCBs, the foil pattern is shown at Figure II.

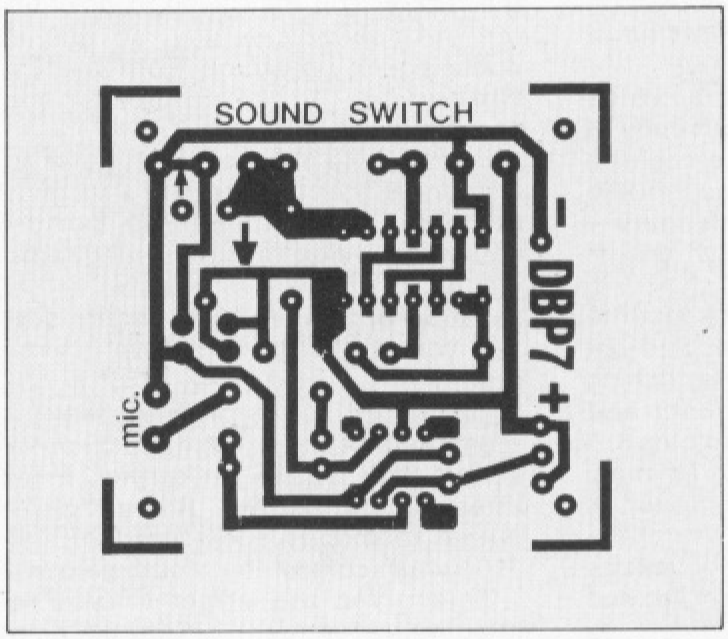


Figure II: PCB layout — exact size

Alternatively you can buy a ready-etched and drilled board from RH Design. Use the board as a template for drilling the case before you solder any components.

At the same time, it's a good idea to drill a small access hole so that VR1 can be adjusted when the case is assembled. Dimensions are given in Figure IV.

Figure III shows the component layout for the basic sound-operated switch. Notice that the 741 IC is inserted "upside down", with pin 1 in the top right position.

This IC needs no special handling precautions, but the 4001 chip is a CMOS device, so treat it with care. Avoid handling it unduly and get rid of any static charge on your hands by gripping an earthed metal appliance before touching the IC pins.

The amplifier (Stage 1) is matched to a microphone impedance of around 200 ohms, so a standard cassette mike will work very well.

Telephone inserts also give good results and these are cheaper and more robust, especially for applications which involve tapping or blowing. Crystal and other high-impedance microphones are not suitable.

Connect the microphone and joystick leads to their respective terminal blocks as shown in Figure III. If the mike has a screened lead, its outer braiding should go to the pin nearest VR1.

We've assumed you will connect the gadget's output to the fire button line at joystick pin 6, but any of the other four on/off input lines (pins 1,2,3 and 4) will work, provided you modify the software.

If you use joystick Port 1, these pins return a four-bit word at address 632, as we have explained in previous articles.

Plug the gadget into Port 1 and run Program I. Adjust the variable resistor until the number on screen is 0, then advance it until the number changes to 1 and holds there reliably. The text window will also change colour, so it's easy to spot the transition.

Now clap your hands near the mike.

The number should change momentarily to 0, then return to 1. Fine adjustment of the variable resistor will set the sensitivity to suit your application.

At its best, the gadget will respond to a snap of the fingers at up to three

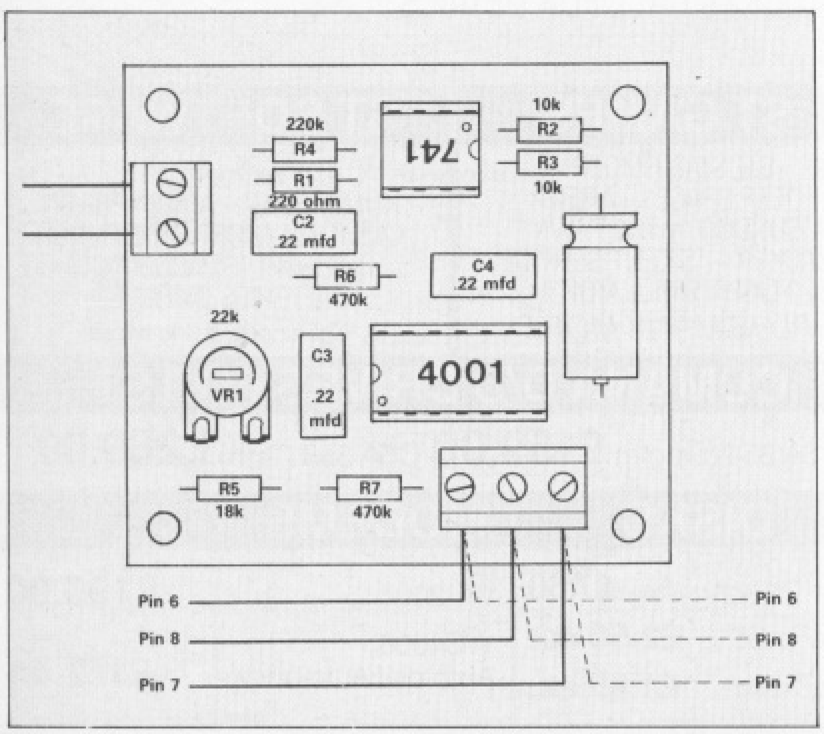


Figure III: Component layout for the switch circuit

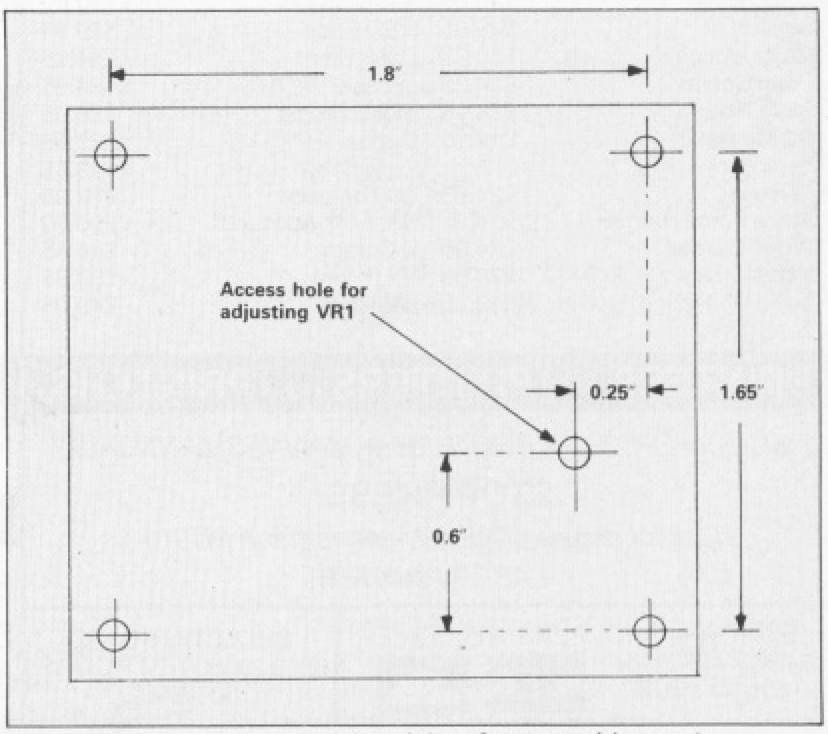


Figure IV: Case drilling template (view from outside case)

metres distance, or a pin dropping on a hard surface close to the microphone.

To give your joystick a voice operated fire button, use both ends of the extension cable. Cut the cable to remove a section from the middle leaving you with suitable lengths – about six inches in from each end of the cable is best.

Strip back the black outer sheath to expose the nine internal wires and join each wire back to its partner, matching the colours. Solder the joints and insulate all except the ones to pins 6, 7 and 8, then connect those three joints to the terminal block as shown in Figure III.

If you want to disable the joystick's own fire button, leave the socket end of wire 6 disconnected.

Plug your joystick into the extension socket, load up a game and set the gadget's sensitivity low enough to eliminate spurious triggering. Then shout, clap or whistle to blast away.

There's scope here for some simple fund-raising games if you can stand the racket. You may need to position the mike fairly carefully, so that it doesn't pick up sound from the TV speaker or other inappropriate sources.

If you would like the output pulse to last longer than one tenth of a second, there are two options. You can increase the value of R6 (10 megohms will give a delay of around three seconds) or you can build a delay loop into your software, as shown in Program II.

Program III is the "talking head" I mentioned earlier. Lines 10 to 50 put a simple face shape on screen, then lines 60 and 70 use the gadget's output to modify addresses 709 and 710, which control the mouth colours.

This gives the effect (if you're imaginative enough) of lips opening and closing. OK it's a primitive program – but you could use the same principle for a much more impressive multi-coloured display, say in graphics mode 7.

Remember though that inexpensive mikes respond best to high frequencies. The gadget will pick up most consonants without difficulty, but it may not detect vowels unless you're very close.

The gadget can easily be modified to accept other types of input – for example, you can trigger it by touching the microphone input, even if there is no mike connected.

It's easy to make a touch-sensitive switch by attaching a wire, or metal pad (for example Maplin type HY01B), to the terminal pin nearest the mounting hole.

Many types of sensor – such as thermistors, pressure transducers and moisture detectors – change state slowly, so can't be connected directly to the on/off input lines.

Others (like photodiodes), can switch on and off so rapidly that the trigger pulse may be long gone by the time your computer gets around to looking for it. This gadget can be used as an interface for both types of signal.

To modify the board, leave out all the amplifier components and fit a two-way terminal block in place of R5,

```
10 GRAPHICS 2
20 S=PEEK(644):POSITION 9,4:? #6;S
30 POKE 710,6*S:GOTO 20
```

LINE	CHSUM	LINE	CHSUM	LINE	CHSUM
10	2041	20	5716	30	3659

Program I

```
10 GRAPHICS 2
20 S=PEEK(644):POSITION 9,4:? #6;S
30 IF S=0 THEN FOR DELAY=1 TO 500:NEXT
 DELAY
40 GOTO 20
```

LINE	CHSUM	LINE	CHSUM	LINE	CHSUM
10	2041	20	5716	30	7819
40	1418				

Program II

```
10 GRAPHICS 19:POKE 709,40:POKE 710,0
20 COLOR 1:PLOT 14,3:DRAWTO 26,3:DRAWT
O 26,16:DRAWTO 14,16:DRAWTO 14,3
30 PLOT 17,7:PLOT 23,7:PLOT 20,9
40 COLOR 2:PLOT 17,12:DRAWTO 23,12
50 COLOR 3:PLOT 17,13:DRAWTO 18,13:PLO
T 23,13:DRAWTO 22,13:DRAWTO 22,14:DRAW
TO 18,14
60 S=PEEK(644):IF S=1 THEN POKE 710,0:
GOTO 60
70 IF S=0 THEN POKE 710,40
80 GOTO 60
```

LINE	CHSUM	LINE	CHSUM	LINE	CHSUM
10	6207	20	12595	30	5739
40	5730	50	14961	60	7519
70	4174	80	1426		

Program III

as shown in Figure V.

Connect your sensor to this terminal block – if it's polarised, such as a photodiode, make sure the negative end goes to the left-hand terminal. Adjust VR1 as before so that the gadget triggers at your chosen threshold.

If you want to use a thermistor choose one whose resistance is between 5k and 20k at the desired trigger temperature – type VA1055S is suitable for most purposes.

A rise in temperature will send the output low and it will stay that way until the temperature falls a degree or two below your pre-set threshold.

Any commonly-available photodiode or phototransistor will work and a very brief flash of light will trigger the output pulse. Steady illumination will hold the output low until the light level falls back below your threshold value.

Now suppose you want it to work the other way round – to make a counting device which increments when a light beam is momentarily broken, for example. That's easily achieved, but it requires a bit of engineering.

Look at the track side of the PCB. Just above VR1 you'll see a pattern of four pads which have not been drilled and below them two arrows.

Break the tracks at the two arrows, drill the four new pads and fit a wire link horizontally – parallel to the terminal blocks – across each pair of holes.

This reverses the positions of VR1 and R5, so the terminal block will now be connected between point A and +5V instead of point A and 0V.

If your sensor is polarised, make sure its positive lead now goes to the left-hand pin. In all other respects, the gadget will perform exactly as before.

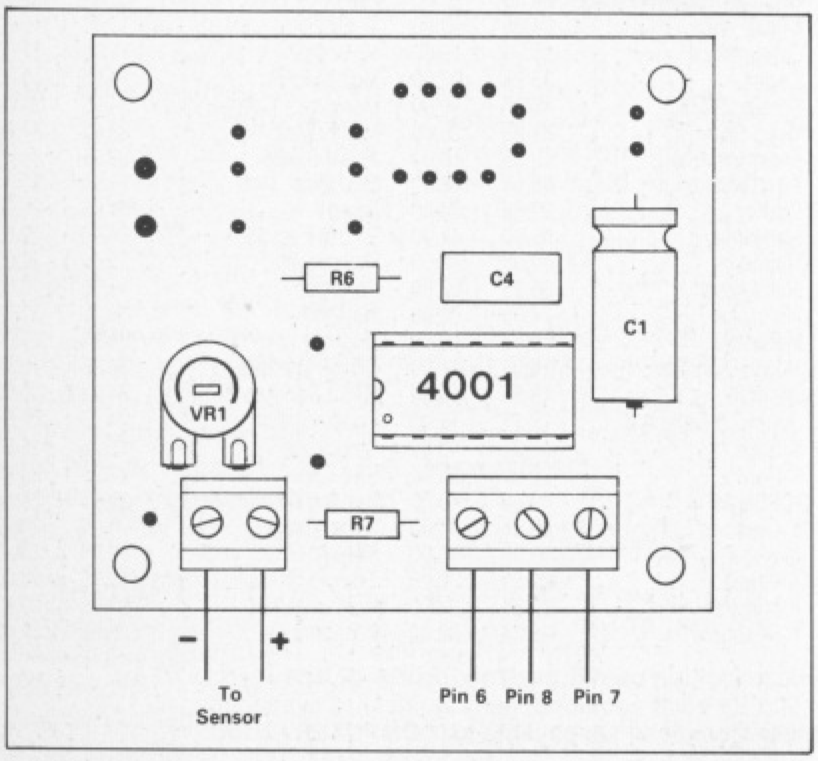


Figure V: Modified board layout for use with alternative input devices

PARTS REQUIRED FOR SOUND-ACTIVATED SWITCH

		Maplin codes
1	uA741 8-pin Op Amp	QL22Y
1	4001 Quad 2-input NOR gate	QX01B
1	8-pin DIL IC socket	BL17T
1	14-pin DIL IC socket	BL18U
1	2-way PC terminal block	FT38R
1	3-way PC terminal block	RK72P
2	Cable 'P' clips 3/16"	LR44X
3	0.22 mfd Polyester layer capacitors	WW45Y
1	100 mfd 10v Axial Electrolytic	FB48C
1	Small plastic box	LH14Q
1	200 ohm cassette microphone (eg Maplin YB31J), or tele phone insert	
Miniature resistors:		
1	220 ohm (red, red, brown)	M220R
2	10k (brown, black, orange)	M10K
1	18k (brown, grey, orange)	M18K
1	220k (red, red, yellow)	M220K
2	470k (yellow, violet, yellow)	M470K
1	22k Horizontal sub-miniature preset	WR59P

Approximate cost £3.20 plus microphone

All components, including all sensor devices mentioned in the text, are available from:

Maplin Electronic Supplies
P.O. Box 3
Rayleigh
Essex
SS6 8LR
Tel: 0702 552911

Printed circuit board (order code DBP7) available from:

R.H. Design
137 Stonefall Avenue
Harrogate
North Yorkshire
HG2 7NS
Tel: 0423 508359

Price £1.48 including VAT and postage.

Joystick extension lead available from Tandy stores (code 276-1978) or from large computer shops. Price around £3.30.

On your bike



Program: BMX Simulator
Price: £1.99 (cassette)
Supplier: Code Masters, 1 Beaumont Business Centre, Beaumont Close, Banbury, Oxon OX16 7RT.
Tel: 0295 68426.

THIS is another action-packed game involving healthy competition against the computer or a friend.

The title is a little misleading – it's not a true simulator since the view is from above, but that shouldn't detract from what is a fairly good game at the price.

Your task is to race your BMX bike round a track, avoiding various obstacles. There are seven different courses, each more difficult than the last, and with less time allowed to complete each race.

A steady hand and a level head are needed here. The courses can be learnt gradually over a period of time, so even the worst games player sees a marked improvement as he plays.

Richard Darling, author of the Commodore 64 original, has also incorporated an action replay feature, complete with slow motion, which is unique for a game of this type.

The graphics aren't bad, but I've seen better. The courses are appropriately laid out, and the "Burms", as they're called, slow you down on the way up and help you speed up and turn on the way down.

There are ramps and rough ground to traverse, and obstacles which stop you getting back on the course if you wander off line.

As the view is from above, the bikes appear quite small, but if you crash the rider flies over the handlebars and bike and rider are revealed quite realistically.

The music, written by David Whittaker, is catchy and pleasant, and includes a short fanfare at the end of each round. Sound effects include pedalling and thuds as you crash.

If you're a BMX fanatic, or prefer racing to spaceing, then this game is right up your street – and it's cheap enough to buy without leaving too great a dent in your pocket money.

Rob Anthony

Sound:	*8*
Graphics:	*8*
Playability:	*8*
Value for money:	*8*
Overall:	*8*

Fine quartet



Program: Shoot 'Em Ups
Price: £9.99
Supplier: US Gold, Units 2/3, Holford Way, Holford, Birmingham B6 7AX.
Tel: 021-356 3388

COMPILATION packages abound these days, and that is generally good news for both software houses (who get extra mileage from ageing games), and Joe Public (who gets the benefit of buying games at very much reduced prices).

Cynics might say that they are an excuse for jobbing out otherwise unsaleable games on the back of one big seller.

While that may well be true in some instances, it is definitely not so with this latest offering from US Gold.

The four games in the package are Super Zaxxon, Blue Max 2001, Fort Apocalypse and Dropzone. Instructions in compilations are sometimes a little skimpy, but US Gold has provided a comprehensive and well detailed set for all four.

Super Zaxxon is a fair representation of an old arcade favourite. You fly over enemy fortresses and through tunnels in glorious 3D, dodging force fields, shooting, bombing and battling with fire-breathing dragons along the way. Graphics and sound are both satisfactory, and although the pace is a little slow it remains very playable.

Blue Max 2001 owes much to Zaxxon for its style, there being many similarities in the gameplay and appearance.

Again you must bomb or shoot anything that does or doesn't move, progressing to the next level after a precision bomb run on a special target.

While Fort Apocalypse is let down to a certain extent by blocky graphics, the game itself is excellent and thoroughly addictive.

Your task is to rescue stranded prisoners in your helicopter, dodging and shooting floating mines, tanks and robocopters, ultimately blasting the very heart of the fortress.

Dropzone is to my mind the best of the collection, and perhaps the best all-out blaster I have seen for the Atari.

The graphics are superb, the sound excellent and the action smooth, fast and furious.

Your moon base is attacked by aliens and you must gather in your comrades to the relative safety of the base.

Apart from the aliens you'll have to watch out for molecular acid clouds, proton lightning bolts and erupting volcanoes. This game is sheer chaos and destruction from start to finish.

All in all, Shoot 'Em Ups lives up to its name

Niels Reynolds

Sound	*8*
Graphics	*8*
Playability	*9*
Value for money	*10*
Overall	*9*

Rambo rampage



Program: Gun Law
Price: £1.99 (cassette)
Supplier: Mastertronic, 8-10 Paul Street, London EC2A 4JH.
Tel: 01-377 6880

THE sales hype on the Gun Law pack starts off: 'Four months of bloody alien attacks have taken their toll...'.

However anyone buying this game and expecting to see aliens is going to be in for a surprise and possibly a disappointment.

There you are in your smart blue army uniform at the bottom of the screen, brandishing your machine gun, ready to sort out the invaders from outer space. But hold on, those are soldiers shooting at you. In fact they are identical to you in every respect, but for the fact they are wearing green instead of blue. Whatever happened to the aliens? I certainly never saw any.

Anyway, the aim is to run up the screen with the background scrolling vertically downwards, fending off your attackers.

Various objects can be used as cover from enemy fire, such as trees, fences, rocks and buildings.

Due to some programming laziness, grass, ponds and small pebbles will also stop speeding bullets.

Once you reach the end of the zone (no easy feat) you must negotiate a flashing electric fence and then go through the same exercise in the next zone. Naturally your enemies are better armed and there are more hazards to contend with. So it goes on until you reach the fifth and final level.

The graphics in Gun Law are adequate, though they do have some oddities.

For example, an alien walking in front of your Ramboid character is masked out as if it had gone behind.

The animation of the figures is minimal and movement is limited to up, down, left and right. The game would have been improved by the inclusion of diagonal movement.

With the high standards attained by many of the budget games around these days, I had expected a little more from this game.

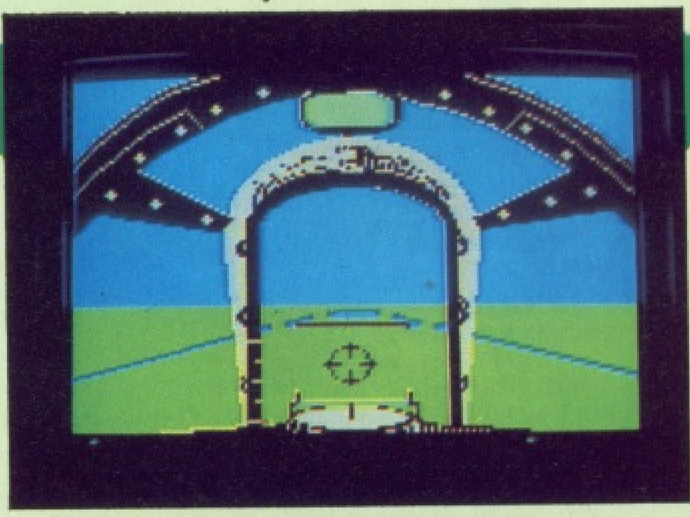
It has nothing to particularly recommend it, but neither does it have any serious faults.

Gun Law is a no-frills budget shoot-'em-up and as such still represents fair value at under £2.

Paul Mills

Sound	6
Graphics	7
Playability	7
Value for money	7
Overall	7

Bandits ahead



Program: Spitfire 40
Price: £9.95 (cassette) £12.95 (disc)
Supplier: Mirrorsoft, Maxwell House, 74 Worship Street, London EC2A 2EN.
Tel: 01-377 4600

"SCRAMBLE! Scramble! Bandit coming out of the sun at one o'clock."

"He's all yours, Ginger, and try not to prang it in the briny this time."

Now that's the sort of gung-ho atmosphere I was hoping would be generated by this Spitfire flight and combat simulation program. Alas, it was not to be.

While Spitfire 40 is quite a good little simulation it didn't quite have the zip and excitement I had anticipated. Perhaps it was because I felt that much better use could have been made of the sound potential of the Atari.

The main screen is, as you would expect, a view straight ahead from your seat in the cockpit.

Not much to see, really, except acres of green grass and miles of the wild blue younder.

Pressing the spacebar toggles you to and from the instrument screen. This shows fuel gauge, airspeed indicator, artificial horizon, VSI, engine rev indicator, slip and turn indicator, compass, altimeter, rudder and pitch indicator.

A further screen provides a map of South-East England showing your position and three areas which can be examined in more detail by a zoom feature.

You control the Spitfire using either a combination of joystick and keyboard or keyboard only.

Spitfire 40 lets you choose a practice flying session or to go straight into combat. Unlike many simulators, getting the plane off the ground and keeping it up there is pretty easy.

In combat mode a number of enemy craft will appear, sometimes ahead, sometimes in your rear view mirror.

You give chase and manoeuvre your Spitfire to line the enemy up in your sights.

When you fire you hear the rat-a-tat-tat of your eight Browning machine guns and see the bullets spraying out from below both sides of your cockpit.

If the enemy craft is hit it immediately but silently disintegrates and disappears.

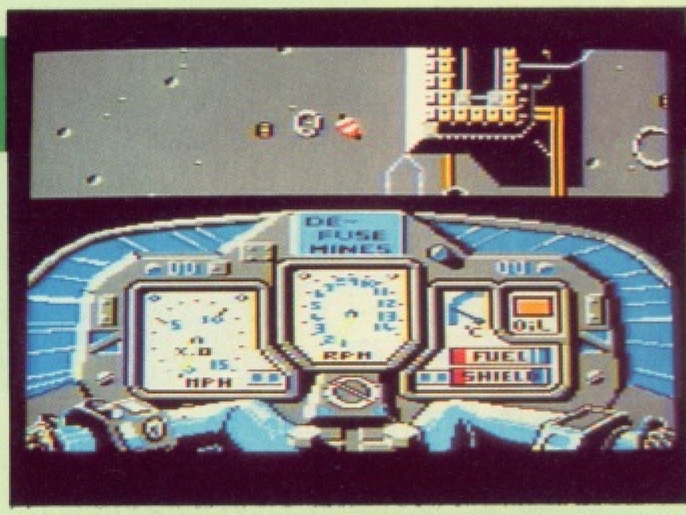
Response to joystick and keyboard is a fraction slow but not so much that it spoils the gameplay.

Not quite the spiffing show I'd hoped for, old bean, but jolly fair nonetheless. Chocks away!

Bob Chappell

Sound	6
Graphics	7
Playability	7
Value for money	6
Overall	7

Fight to survive



Program: Red Max
Price: £1.99
Supplier: Code Masters, 1 Beaumont Business Centre, Beaumont Close, Banbury, Oxon OX16 7RT.
Tel: 0295 68426

THE screen shots on the inlay card looked promising and I had high hopes for Red Max. After 22 minutes loading my enthusiasm was beginning to wane slightly, but thankfully it loaded first time.

The storyline revolves around the survivors of Earth's Global War who have colonised the moon.

They become a little concerned on discovering that the sun is about to explode, so they fit the moon with a few anti-gravity orbs, catapult it from the solar system, and kip down for 1,200 years – planning on waking up long after the sun has gone nova.

Things start off well enough for the fugitives, but unfortunately a band of renegade Death Lords hitch a ride in order to sabotage the power plants.

It is your job to get on your lunar motorbike, find the mines they have planted and de-activate them.

Having disabled the mines you progress to the engineering level, turn on the back-up nuclear cooling systems and shut down the main power plants.

Lastly you must descend to the hibernation complex and wake up nine crew members. You have an aerial view of the whole operation.

Controlling the bike with the joystick is simple. The only controls, apart from left and right, are acceleration and deceleration, achieved by pressing and releasing the fire button.

You must avoid collisions with buildings and walls while negotiating flashing laser fences and gates.

To neutralise the mines, collect fuel, temporarily disable laser fences and switch off reactors, you'll have to ride over certain key objects.

I found the game very pleasing visually, with smooth movement and detailed graphics.

There are complaints, however. In particular the bottom two thirds of the screen is taken up by the motorcycle console which shows speed, revs, fuel level and the state of your shields.

There is also a small prompt screen that tells you what to do next and warns of low fuel levels.

The console looks very pretty, but actually contributes little to the game.

Despite this, Red Max is one of the best budget games I've seen

Paul Mills

Sound	8
Graphics	8
Playability	9
Value for money	9
Overall	9

Trickier Willie



Program: Jet Set Willy
Price: £7.95 (cassette) £12.95 (disc)
Supplier: Tynesoft, Unit 3, Addison Industrial Estate, Blaydon, Tyne and Wear NE21 4TE.
Tel: 091-4144611

JET Set Willy was originally written for the Spectrum and remains one of the all-time greats of computer gaming.

Tynesoft have now produced it under licence for the Atari, nearly three years after it was originally published by Software Projects.

The story so far: Miner Willy has returned home from his adventures and throws a party to celebrate.

However Maria his housekeeper won't allow him into bed until he has gone around the mansion and collected all the glasses.

You move Willy through the house and grounds, down stairways, up trees, swinging over obstacles on ropes, making jumps that require great precision and avoiding the many and various creatures that are out to get him.

The game remains faithful to the layout of the original, but unfortunately loses in the translation.

The graphics on the Spectrum are bright, lively and have a great deal of humour and charm.

Tynesoft seems to have made the conversion too literally. With the Atari's far superior graphics capabilities I had expected a riot of colour and fast moving action.

I got neither, the graphics being lacklustre, controls sluggish and the movement too slow.

Tynesoft has very definitely improved one part of the game – the music is superb. It can be switched off if necessary, but I really enjoyed it and kept it on.

If the music is switched off you are left in total silence, with none of the trills, bleeps and burblings that denote jumping, falling or whatever.

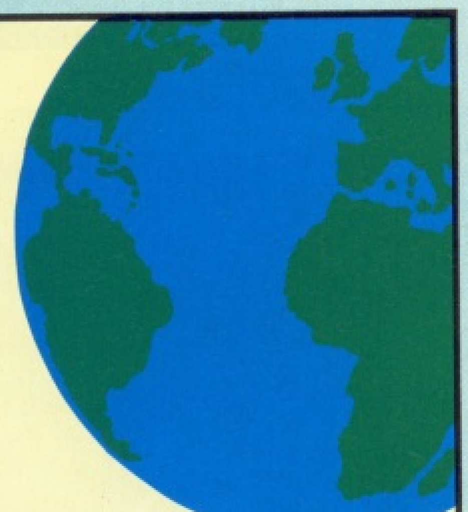
No great loss perhaps, but I do feel they would have added to the atmosphere. In its own right, the game is playable and more tricky to get through than the original.

The coordination and accuracy required to clear the gremlins and obstacles is considerable and the game will still appeal to those who like this sort of pixel-scraping challenge.

Niels Reynolds

Sound	8
Graphics	6
Playability	6
Value for money	7
Overall	6

Now's the time to link your Atari to the big wide world!



Join the communications revolution and use your Atari (plus the telephone) to roam the world... logging on to Microlink, Telecom Gold, Prestel, Micronet and the ever-growing number of bulletin boards, both in the UK and USA. Help yourself to hundreds of free telesoftware programs – and much, much more!



You'll be able to read all about it in Britain's No. 1 communications magazine TeleLink. Each issue contains an up-to-the minute guide to all the modems and comms software now available for the Atari range.

● Here's a special offer for readers of ATARI USER For every subscription ordered using the form below, we will give you free registration to MicroLink, worth £5.

If you would like to take advantage of this offer, don't forget to tick box!

ORDER FORM

Valid to March 31, 1986

	UK & Eire	Europe	O'seas Airmail	(✓)		£ p
One copy of the latest issue of TeleLink	£1.75	£2	£2.50	☐	5021	
Subscription to the next 12 issues of TeleLink	£15	£23	£38	☐	5001	
Tick this box if you would like free registration to MicroLink (Only available if you subscribe to TeleLink)				☐	5019	FREE
TeleLink binder	£3.95	£6.95	£10.95	☐	5017	

Payment: please indicate method (✓)

☐ Access/Mastercard/Eurocard/Barclaycard/Visa

Card No. ☐☐☐☐ ☐☐☐☐ ☐☐☐☐ ☐☐☐☐

☐ Cheque/PO/Eurocheque made payable to Database Publications Ltd. Exp. date ☐ / ☐

Name ______________ Signed ______________

Address ______________

______________ Tel: ______________

Send to: *TeleLink*, FREEPOST, Europa House, 68 Chester Road, Hazel Grove, Stockport SK7 5NY.

Order at any time of the day or night

Telephone Orders:	Orders by Prestel:	MicroLink/Telecom Gold
061-429 7931	Key *89, then 614568383	72:MAG001

Don't forget to give your name, address and credit card number

AT3

The truth about TELEX

How much does it cost to go on Telex?

You could go the conventional way and buy a dedicated Telex machine. The cheapest will cost you £1,604 (the Whisper), the dearest £2,892 (the Cheetah). You will also need a separate telephone line, costing £101 to install, plus £404 a year rental. That's a total outlay over the first year of a minimum of £2,109. (All prices include VAT.)

Or you could do what more and more micro users are doing – use your Atari to double as a Telex machine. And just use your ordinary telephone!

How do I turn my Atari into a Telex machine?

All you need is a modem and appropriate communications software (see the advertisements in this issue), a telephone, and a subscription to *MicroLink*.

Telex is just one of a growing number of services available to micro users on *MicroLink*. With it you can also read the news as it happens, go teleshopping, create your own closed user group, send telemessages and electronic mail right round the world, download free telesoftware programs directly into your micro . . . and much more.

But why use Telex?

Because it's a standard means of instant communication between businesses. Today there are 150,000 Telex machines in use in Britain – and more than 2 million worldwide. They need it to dramatically speed up business communications – just as quick as using the phone but far more efficient, because you have a hard copy of every "conversation" for your records.

But there's a big bonus you get when you use *MicroLink* for Telex that the conventional way doesn't offer.

With *MicroLink* you don't HAVE to be in your office to send or receive Telex messages. You can just as easily use your computer at home (or even a portable). So now you can check whether there are any Telex messages waiting for you – anywhere, anytime. How's that for your business efficiency?

MicroLink application form: Page 8

The Payoff goes something like this

By Brillig

JUDGING by the number of letters received on the subject, one of the most frequently played adventures seems to be The Payoff, so it's not surprising that I should get more requests for assistance with this than with most others.

Conrad Wilson of Llangollen knows that you have to change the bit in the drill but cannot find the exact combination of words to do it.

He is also having some difficulty getting the hoist and wonders who has the key to the car.

On the same adventure, Domhnall Dods from West Lothian has almost finished but cannot help triggering the alarm when he drills through the door of the vault.

GLITCH OF THE MONTH

Stewart Parsons from the Isle of Wight has spotted a cracking glitch in, of all things, Infocom's Spellbreaker. To get the cube from the hermit's hut, you're supposed to collapse the hut by using the Caskly spell.

However, if instead you CAST FROTZ AT CUBE then EXTINGUISH CUBE, the response begins "(taking the cube first)" ... which leaves you nicely in possession of the cube. Well done, Stewart, that's a smasher.

Perhaps you're trying to get in the wrong way, Domhnall – have a look at the hoist hints.

Staying with The Payoff, Stewart Parsons from Cowes would like to know the exact words for getting through the window.

Stewart would also like some advice on how to get the cube from the Roc's nest in Infocom's Spellbreaker and how to get the alloy wheel in Level 9's The Price of Magik.

Finally, F. Chessell of Brighton is anxious to know how to solve a couple of problems with Lords of Time from Level 9.

He wants to know how to overcome the troublesome Pirate Pete and what to do in the colossal Habidrome.

That's all the help for this month. Be sure my YTS gnomes stay busy by keeping those letters rolling in. After all, they are being paid two ounces of Troll's gold a week and must have something to do besides plagiarise all my best spells. Exciting adventuring!



CLUES CORNER

Read these clues backwords if you're really stuck

THE PAYOFF

Want to use a new bit in the drill?
TIBT IF
Is the hoist causing you to despair?
TLUA AVEH TRET NEOT TIES U
TSIO HOGN EHTT SIOH GIR
How do you get the key to the car?
KRAP RACE HTNI YEKE HTSA HECN EFEH T
XOBT ISOP EDEF ASEH TMOR FMEG EHTM IHEV IG
Window smashing causing you pane?
PMUJ NEHT REPA PSWE NKCI TSEL CAER TDAE RPS

SPELLBREAKER

Cube in the roc's nest immovable?
TNES BASI CORR EHTO MNEH WTSE NEHT OTOG
TSEN EHTO TETU ORWE NARO FMOO RRIA EHTN IRAA
ZABE HTOT OG

PRICE OF MAGIK

Need the alloy wheel?
YRFL EBEH TMOR FTAB EHTD EENU OY
SSOR CEHT GNIS UTIE SITO NPYH

LORDS OF TIME

Pirate Pete a pest?
RULT EGOT GNIK IVOT TAOC RUFE VIG
SGNI KIVN OMMU SOTR ULWO LB
Unhappy in the Habidrome?
LLAH GNIC NEFN INAM REBY CTHG IF
REVI RDWE RCSH TIWS TOBO RNEP O
SNEL YBUR HTIW STOB OREN IMAX E

CIO devices:

Easier file handling

IN the first two parts of this series we looked at the theory behind data input and output on the 8 bit Atari, and at the operation of the Central Input/Output system. We've also tried out a simple program which used CIO from machine code. Now it's time to look at the other facilities that CIO has to offer.

We have so far seen three CIO commands in use – Open, Put Text and Close – but we didn't go into any real depth on how they worked, or look at the other options available.

There are actually seven general commands available to CIO, plus a whole host of other device-specific instructions. The main commands are: Open, Get Text Record, Get Binary Record, Put Text Record, Put Binary Record, Status and Close.

They all have different uses with different types of device, and not all are applicable for all devices. For example, it is nonsensical to try to Get data from a printer or Put data to the keyboard.

Some commands, most notably Open and Status, may need to operate very differently each time you call them.

With Open, for example, you may wish to create a new disc file, open a long-gap mode cassette file for reading or even set up a channel to a particular graphics screen.

If you remember from last time, we said that each channel has its own control block of data – known as an IOCB – which you must set up before calling the CIO system (See Figures I and II).

Thus each time you use the Open command you need to set the relevant ICCOM byte to 3 and the buffer address (ICBAL and ICBAH) to point to the string containing the device name (such as "D:FRED" or "C:").

Part 3 of André Willey's series on the Atari's input/output facilities

The buffer length pointer (ICBLL and ICBLH) is rarely used with Open, but in order to handle such a wide variety of functions the command does make full use of the first two auxiliary data bytes.

ICAX1 is used to specify the mode you want the device to adopt: If you require input, for example, you would use 4 and output would be 8.

Some devices are capable of doing both at the same time, so the two are added together to give a value of 12 for use with an input/output file.

Sometimes a device is capable of much more – such as the screen handler, which must know what graphics mode you want, and the disc and RS232 handlers which both allow various special options. These facilities are selected by using both ICAX1 and ICAX2: A full list of the options is given in Figure III.

If you examine the screen handler entries very carefully you will spot the answer to last month's puzzle – remember, the two numbers after the channel number in an OPEN statement are stored as ICAX1 and ICAX2 – so all the line did was to simulate the GRAPHICS 7 command using CIO.

After Open, the next four CIO operations control the actual transfer of data to and from the channel, with two commands for input and two for output. Obviously, if you try to output to a channel you've only set up for reading you will get an error.

The two modes of input and output are Line (or Text) and Binary, both of which actually operate in a very similar manner.

A binary record is a block of characters or data of fixed length, while a text record is a set of characters terminated by a Carriage Return byte (Ascii code 155). Text is normally dealt with in line mode – as Basic does with its strings, for example – whereas raw data is often processed as a binary record.

Command 9 will output a text string

Address	Label	Bytes	Description
IOCB + 0	ICHID	1	Index into HATABS
IOCB + 1	ICDNO	1	Device number (eg: D1:, D2:)
IOCB + 2	ICCOM	1	Command type (eg: OPEN, CLOSE)
IOCB + 3	ICSTA	1	Current Status of Device
IOCB + 4, 5	ICBAL/H	2	Buffer or filespec address
IOCB + 6, 7	ICPTL/H	2	Address of Put-Byte routine (–1)
IOCB + 8, 9	ICBLL/H	2	Buffer data length sent/returned
IOCB + 10	ICAX1	1	Auxiliary byte 1
IOCB + 11	ICAX2	1	Auxiliary byte 2
IOCB + 12	ICAX3	1	Auxiliary byte 3
IOCB + 13	ICAX4	1	Auxiliary byte 4
IOCB + 14	ICAX5	1	Auxiliary byte 5
IOCB + 15	ICAX6	1	Auxiliary byte 6

Figure I: IOCB structure

IOCB Zero	$340	(832)
IOCB One	$350	(848)
IOCB Two	$360	(864)
IOCB Three	$370	(880)
IOCB Four	$380	(896)
IOCB Five	$390	(912)
IOCB Six	$3A0	(928)
IOCB Seven	$3B0	(944)

Figure II: IOCB start addresses

Device	ICAX1	Description/Notes
Cass "C:"	4	Input data (Set ICAX2=128 for short IRG mode)
	8	Output data (Set ICAX2=128 for short IRG mode)
Disc "D:"	4	Open file for read
	8	Open for write (overwrite any existing file)
	12	Read/Write (start at first byte of old file)
	9	Append (add data to end of existing file)
	6	Read directory (read lines of directory info.)
Editor "E:"	8	Screen output only
	12	Keyboard input, screen output
	13	Screen input and output (Return key mode)

Device	ICAX1	Description/Notes
Keyboard "K:"	4	Read keyboard
Printer "P:"	8	Output (ICAX2=83 for sideways print on 820, ICAXC2=70 for normal, ICAX2=40 for wide)
RS232 "R:"	5	Concurrent read only *
	8	Block output mode *
	9	Concurrent write mode *
	12	Concurrent read/write mode *
Screen "S:"	8	Open for graphics output
	12	Open for graphics AND screen read mode (Set ICAX2 = Graphics mode number) ICAX1 + 16 to enable a text window ICAX1 + 32 to prevent initial clear screen

** Some of the RS232 functions are very complex and are beyond the scope of this series. However, once enabled, concurrent I/O mode will prevent the use of any other peripheral I/O.*

Figure III: OPEN command parameters

starting at the address in ICBAL/H and will keep sending characters until it comes to a Carriage Return.

Don't forget that whole numbers which need to be stored in two bytes — such as the buffer address in ICBAL and ICBAH – are always stored in the low-high format we talked about last time.

Command 5 is the input option for use with text strings. This will continue reading characters from the I/O channel and storing them in your buffer area (again given by ICBAL/H) until it finds a Carriage Return.

If you are worried that this might overflow your buffer area you can also specify a maximum number of characters by storing the size in the ICBLL/H length count.

Command 11 is the Binary Put command, which will send a specific number of bytes to the file. The start of the buffer is given as ICBAL/H and the length is given by ICBLL/H.

Command 7 is the input command for binary data, which will input a given number of bytes of data and place them into your buffer area. As with Binary Put, the buffer address is given as ICBAL/H and the number of bytes to transfer by ICBLL/H.

It is quite common practice to use Binary Get mode to read a whole file into memory and to this end CIO will return the actual number of bytes which were transferred before the end of the file was reached. This number can be found in the length counter (ICBLL/H) upon completion.

In addition, there is a special form of the Binary Put and Get commands. If you select a length of zero – by placing a zero in both ICBLL and ICBLH – then a single byte of data will be transferred to or from the 6502's main A register.

No data is placed into or read from the normal buffer area and it is up to you to store the A register correctly afterwards.

For some reason, only this special case of binary data transfer is supported by Basic, making fast handling of large blocks of memory almost impossible without resorting to machine code.

Program I will solve this little problem for you. The machine code routine is poked into page 6, though there is no

```
10 REM BINARY PUT/GET ROUTINE
20 REM ATARI USER, MARCH 1987
30 REM BY ANDRE WILLEY
40 REM
50 REM ROUTINE MY BE RELOCATED, OR
       PLACED IN A STRING IF REQUIRED
60 DIM BUF$(100):FOR I=1 TO 100:BUF$(I
)=CHR$(I+32):NEXT I
70 REM
80 REM ******************************
90 REM
100 REM POKE M/CODE INTO PAGE 6
110 FOR MEM=1536 TO 1536+51:READ A:POK
E MEM,A:NEXT MEM
120 REM
130 REM *****************************
140 REM
1000 GRAPHICS 0:PRINT " PRESS RECORD A
ND PLAY, THEN RETURN";
1010 CHAN=1:OPEN #CHAN,8,0,"C:"
1020 CMD=11:REM **** 7 FOR INPUT ****
1030 BUFFER=ADR(BUF$)
1040 SIZE=50
1050 BYTES=USR(1536,CHAN,CMD,BUFFER,SI
ZE)
1060 CLOSE #CHAN
1070 PRINT :PRINT "   ";BYTES;" BYTES
WRITTEN TO CHANNEL #";CHAN
1080 REM
1090 REM *****************************
1100 REM
1110 PRINT :PRINT :PRINT "REWIND TAPE,
 PRESS PLAY - HIT RETURN";
1120 CHAN=2:OPEN #CHAN,4,0,"C:"
1130 CMD=7:REM *** 11 FOR OUTPUT ****
1140 BUFFER=ADR(BUF$)
1150 SIZE=100:BUF$(1,50)="EMPTY!!!"
1160 BYTES=USR(1536,CHAN,CMD,BUFFER,SI
ZE)
1170 CLOSE #CHAN
1180 PRINT :PRINT "   ";BYTES;" BYTES
 READ FROM CHANNEL #";CHAN
1190 PRINT :PRINT :PRINT "DATA READ =
";BUF$(1,BYTES)
1200 END
1500 REM
1510 REM *****************************
1520 REM
2000 REM DATA FOR USR ROUTINE TO READ
        n BYTES FROM A DATA CHANNEL
2010 DATA 32,68,218,104,201,4,208,43
2020 DATA 104,104,10,10,10,10,170,104
2030 DATA 104,157,66,3,104,157,69,3
2040 DATA 104,157,68,3,104,157,73,3
2050 DATA 104,157,72,3,32,86,228,132
2060 DATA 203,189,72,3,133,212,189,73
2070 DATA 3,133,213,96
```

Get it right!

LINE	CHSUM	LINE	CHSUM	LINE	CHSUM
10	5444	20	5092	30	4037
40	871	50	13001	60	9520
70	871	80	4651	90	871
100	5175	110	9310	120	871
130	4441	140	871	1000	13391
1010	4638	1020	5475	1030	3233
1040	1433	1050	7413	1060	2212
1070	11552	1080	871	1090	4273
1100	871	1110	14574	1120	4620
1130	5775	1140	3233	1150	5126
1160	7413	1170	2212	1180	10877
1190	9359	1200	836	1500	871
1510	4273	1520	871	2000	13111
2010	4853	2020	4876	2030	4757
2040	4738	2050	4851	2060	5050
2070	2801				

Program I.

ICCOM	Command	Notes
3	Open	ICBAL/H = Pointer to file spec. See Figure III.
5	Get Text	ICBAL/H = Buffer address; ICBLL/H = max. length
7	Get Binary	ICBAL/H = Buffer address; ICBLL/H = length If ICBLL/H = 0, use single-byte A-register mode
9	Put Text	ICBAL/H = Buffer address; ICBLL/H = max. length
11	Put Binary	ICBAL/H = Buffer address; ICBLL/H = length If ICBLL/H = 0, use single-byte A-register mode
12	Close	No parameters needed
13	Status	ICBAL/H = Pointer to filespec (if not open) Results in ICSTA, plus optional DVSTAT ($2EA)
32	Rename (D:)	ICBAL/H = Pointer to filespecs (eg: "D:OLD,NEW")
33	Delete (D:)	ICBAL/H = Pointer to filespec

ICCOM	Command	Notes
35	Lock (D:)	ICBAL/H = Pointer to filespec
36	Unlock (D:)	ICBAL/H = Pointer to filespec
37	Point (D:)	ICAX3=Sector LSB, ICAX4=Sector MSB, ICAX5=Byte no.
38	Note (D:)	ICAX3=Sector LSB, ICAX4=Sector MSB, ICAX5=Byte no.
254	Format(D:)	ICBAL/H = Pointer to drive spec (eg: "D1:")
17	Drawto (S:)	Draws line to ROWCRS ($54), COLCRS ($55/6)
18	Fill (S:)	Fills from ROWCRS, COLCRS with FILDAT ($2FD)
32	Special (R:)	Output partial block: See Atari 850 manual
34	Special (R:)	Control RTS, XMT, DTR: See Atari 850 manual
36	Special (R:)	Set baud, stop bits & word size: See Atari 850 manual
38	Special (R:)	Set Ascii/AtAscii mode: See Atari 850 manual
40	Special (R:)	Enable concurrent I/O mode: See Atari 850 manual

Figure IV: CIO command options

reason why you shouldn't place it into a string just as easily. The run address is 1536 and the parameters are as follows:

1. Address of machine code (1536)
2. The channel number (which you should have already OPENed for input or output)
3. The command number (7 for input, 11 for output – used by ICCOM)
4. The buffer address in memory (ICBAL/H)
5. The number of bytes to transfer (ICBLL/H)

The USR routine will also return the actual number of bytes transferred. This might be different to the number you actually asked for if the file ended early or the disc was full.

There are just two more major commands to cover now, the first of these being the Status routine. When called, this will return a value to ICSTA for the device in question.

Most devices do little with this facility, but it is especially useful for the printer and the RS232 driver.

The cassette, keyboard, screen handler and editor simply return a token value of 1 to the ICSTA register. The disc system returns a simple set of codes – 1 for normal file, 167 for locked file and 170 for file not found.

Both the printer and the RS232 driver return a block of four bytes of status data and store it in a special location called DVSTAT (Device Status) which is located at $2EA (746 decimal). For more information on its contents, consult your RS232 manual.

Finally we have the Close command, the simplest of them all. All you need do is place the value 12 into the ICCOM register and call CIOV. No other parameters or data are needed.

Some devices – such as the disc, screen and RS232 handler – also have their own unique commands. These are not normal CIO commands but are designed to handle the extra functions supported by that particular piece of hardware or software.

For disc files, command 32 does a Rename, 33 is Delete file, 35 and 36 Lock and Unlock files, 37 and 38 are Note and Point and 254 will format the disc.

Some of these do not need the channel to be previously Opened as they contain the full filespec themselves, pointed to by ICBAL and ICBAH. The Dos manual gives more information on these commands.

For the screen handler ('S:') you can use command 17 to draw a line and 18 to fill part of the screen – again, more information is available in the manuals.

The RS232 driver supports command 32 for sending an incomplete block of data, 34 to control the handshake lines, 36 to alter the baud rates, word size and number of stop bits, 38 to change the Ascii translation mode and finally 40 to start the concurrent I/O mode.

Those of you who have used the XIO command from Basic will by now have realised that XIO is in fact a simple way of calling the CIO system.

The normal format of the XIO command is:

XIO cmd, #channel, aux1, aux2, filespec

The first parameter is the command number (stored in ICCOM). Next comes the channel number (which is converted to the IOCB number).

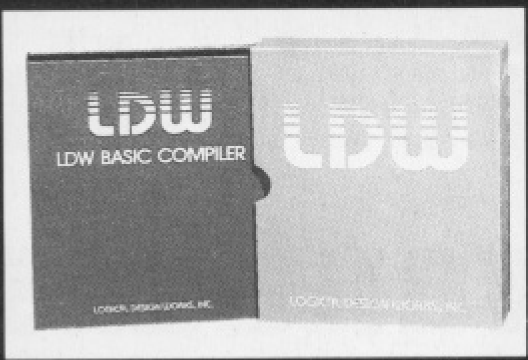
The two auxiliary data bytes are stored in ICAX1 and ICAX2 and the filespec is accessed by setting ICBAL and ICBAH to point to it.

All the CIO commands we have been discussing are listed in full in Figure IV, but if you want to read up some more on the subject take a look at the Operating System User's Manual, which is part of Atari's Technical User Notes.

This month's I/O question is: Why can't we use the very useful XIO command to access the Binary Put and Get functions from Basic, rather than using a special machine code routine to do the job?

● *I'll let you know the answer to that one next time, when we'll start looking at how to make up your own machine code device driver programs, how to patch them into the CIO system and what rules to follow to make them Reset-proof.*

Only £59 inc. VAT
For Atari 520/1040 ST
LDW BASIC COMPILER
The best selling, most professional BASIC in the U.S.A.!



Speed (all times seconds)

Speed (all times seconds)	LDW
• 100'000 empty FOR/NEXT loops	0.7
• Integer calculations	0.3
• Float benchmark	3.7
• Calc benchmark standard BYTE magazine benchmark (May 1985)	3.1
• Sieve benchmark determine first 1651 primes	2.8
• Create 1000 bytes sequential file and read it by bytes (floppy disk environment)	7.7
• Optimization demo	10.2
• Screen output 1000 strings of 70 characters	15.6

Some important LDW BASIC advantages:

Compile time

- Compiler can be invoked as a menu driven GEM application.
- Can be run from a batch file.
- Can be invoked as TOS command, or from any UNIX-like shell.
- Easy to taylor to your system configuration.
- Compatible with all RAM and hard disks.
- Produces binary or assembly source output.
- Many very useful options.

Run-Time

- Application can customize the RAM memory layout.
- Both single and double precision floating point.
- Very fast integer arithmetic.
- LDW BASIC creates the fastest ST programs on the market! (In some cases the best "C" compilers produces marginally faster programs).
- Fully dynamic arrays, i.e. application can re-use RAM memory.
- No other Basic or "C" compiler allows array indices to take any integer value, even a negative! Program may define base of an array.

The first professional Basic compiler for Atari ST has arrived!

The LDW BASIC Compiler is very easy to use, but as powerful as the best professional developer's packages for the "C" language.

Reviews

"LDW BASIC will compile ST BASIC programs into blazing fast. PRG files..."
Dave Plotkin
Antic Magazine

"The LDW BASIC Compiler is clearly superior to its competitors in virtually all respects..."
Stephen Eitelman
Current Notes

"The DAC Easy accounting line for the Atari ST, was developed using LDW BASIC, the best ST BASIC compiler on the market!"
Isreal Aguilar
Vice-President
DAC Software

"I'm very impressed with the performance, and easy of use of the LDW BASIC Compiler. It works beautifully, and there are no nasty surprises!"
Joe Hayden
Micro-Tech Consultants, Inc.

LDW

To get your copy of the LDW BASIC Compiler, just visit your local dealer, or order directly from the Geneva address below.

LOGICAL DESIGN WORKS
780 Montague Expwy, Suite # 205,
San Jose, California 95131 USA, Tel.: (408) 435-1445

LOGICAL DESIGN WORKS S.A.
45, quai Wilson – 1201 Geneva – Switzerland –
Tel. 022/31 97 52 – Telex 28146 dast ch

An ENGLISH SOFTWARE · U.S.GOLD · SYNSOFT Production



We've done it again!

ATARI SMASH Hits VOLUME 7

FOR ALL
48k ATARI 400/800/XL/XE COMPUTERS

£9.95 cassette . £14.95 diskette

Available now from your local Atari dealer or mail order P&P included from:

ENGLISH SOFTWARE

1 North Parade, Parsonage Gardens, Manchester M3 2NH. Tel: 061-835 1358

A compiler's the if you want fast

HAVE you ever sat at your keyboard, gazing at a blank screen, and cursed the snail-like pace with which Basic runs your programs? I doubt if you're alone in this activity – most of us go through it from time to time.

The obvious solution is to write your programs in machine code instead, as this runs hundreds of times faster than Basic and is very much more flexible.

However, machine code is not as easily mastered as Basic and it requires considerable time and effort to create quite small sections of code – you only need to look at the 80 line machine code equivalent to the Basic LPRINT statement last issue to see the problem.

Let's take a look at the reason for the speed differences, and at one possible solution.

Firstly, you must understand that the computer always does its internal work in machine code, no matter what language you decide to write your programs in. So if you use machine code too the computer is given the job in an easily digestible form and can thus function that much faster.

Basic is itself a very sophisticated machine code program which takes your input in simple English-like words and converts them into machine code that the computer can understand.

However, because you will often be adding and deleting parts of your program, Basic only does this conversion when you finally RUN your new masterpiece.

Each line the computer comes to is translated into a machine code form and then executed, then the process starts all over again for the next line.

While the machine code itself is very fast, the conversion process takes time – and this is where the speed problem lies.

The ideal situation would be to write your program in a straightforward English-like language and then have the computer convert the whole lot into machine code in one go.

The result would execute almost as quickly as it would if you had written it in machine code in the first place, because no more complex conversions need be carried out at run time.

Is there an answer to this pipedream? Luckily, there are quite a number of these type of languages – known as Compilers because they compile your program into its machine code equivalent.

These include C, which is also very popular on the ST range, Pascal, Forth, Lisp and many others.

These are all languages which were designed with much larger machines

ANDRÉ WILLEY considers Action! a fine second language for the advanced Basic programmer

in mind and can thus be quite unwieldy to use on an 8 bit micro such as the Atari. They also tend to produce much larger files than a pure machine code author would generate.

A few years ago, a Californian firm called Optimised Systems Software decided to produce a compiler written especially for the 8 bit Atari.

Unlike Forth, Lisp and the others this would have the advantage of being similar in style to Atari Basic but should also be able to create very fast, compact machine code.

Thus Action! was born.

Written by Clinton Parker, Action! is the result of many months of hard work and is now widely regarded as one of the simplest but nonetheless most powerful alternatives to Basic.

The language comes on a special type of cartridge known as a Super-Cartridge, which is a way of packing 16k of information into an 8k slot in memory using a technique called bank switching.

It consists of four main segments – the Editor, Monitor, Compiler and Library.

The Editor is rather like a word processor and is in itself very flexible. It is here that you create your Action! programs in the same way as you would type a letter into AtariWriter.

There are no line numbers, and no LIST command – you simply use the cursor keys to move about your whole program at will.

Full search and replace options are available, and any line may be up to 128 characters long – and each line (or the whole screen) can be scrolled across the normal 40 column screen.

Two windows containing completely separate programs are available and you may cut and paste between them with ease.

Once your program is complete you can return to the Monitor, which allows you to control the system. From here you can select the various options and compile and/or run programs.

The Complier itself is extremely fast – often completing programs many hundreds of lines long in less than a second.

This is the business end of the language and it turns your program text into very compact machine code ready for the 6502 to execute. This code may then be run or saved to disc for later use.

The final module, the Library,

Benchmark	Basic	Basic XL	Action
1	2.02	1.06	0.02
2	6.56	2.02	0.026
3	18.88	7.52	0.82
4	22.14	7.84	0.86
5	25.74	8.60	0.88
6	39.74	15.52	1.00
7	60.38	23.80	1.06
Average	25.07	9.48	0.66

Note: Benchmark 8 is not applicable since Action does not support floating point.

e answer
t action

contains pre-written routines to take the hard work out of programming.

It provides all the features you are used to having at your disposal from Basic, such as input/output operations, graphics and sound, string handling and so on.

This is one way in which Action! manages to create such tiny machine code files (otherwise known as object files) – all these space consuming functions are contained within the cartridge instead of cluttering up your final program.

This does have the drawback that your programs may only be run with the Action! cartridge present, although it is possible to buy a Run-Time Library, which effectively adds this set of routines on to your final object file.

Once this has been done, your program is completely free-standing and may be run on any Atari with or without the cartridge.

Since there are no line numbers, structuring your work carefully is most important. You write your programs as a set of small modules – called Procedures – which may call each other at will.

Each time you call up a procedure you may pass information and variables to it in the form of parameters, which are illustrated in Program I.

There are limits to the ways in which you may use procedures, however – the most important being that you can't forward reference them, meaning that a given procedure must be defined before you try to access it.

Variables must also be defined before you use them, either at the start of the whole program (global variables) or at the start of a procedure (local variables).

Globals may be used anywhere in the program but a local variable may only be called from within its own procedure.

To speed up the computer's job, variables are stored only as whole numbers since fractions take a lot of

→

Program I

```
; Demonstration of Action! Procedures
; N.B. Comments after a ';' are
; ignored by Action!

;**************************************

BYTE FUNC Get_Number()

BYTE TEMP ; Define TEMP as a byte value


PRINT("Please enter a number: ")

TEMP=INPUTB()

; INPUTB simply takes in a BYTE value
; from the keyboard

; Now return the value to the part
; of the program which called this
; routine, with ...

RETURN(TEMP)

;**************************************


PROC Print_Number(BYTE Numb)
; Routine to print a byte number and
; some text


PRINT("The number you typed was ")
PRINTBE(Numb)

; The BE after the PRINT statement
; tells Action! to print a byte (B)
; followed by a Carriage Return - or
; End-Of-Line (E)

RETURN

;**************************************


PROC MAIN()
;Main routine which will be run first

BYTE VALUE,
     COLBACK=710


GRAPHICS(0)

COLBACK=0  ;Make a black background...

VALUE=Get_Number()
; Rather like a GOSUB to Get_Number

Print_Number(VALUE)
; Prints the number we typed in


RETURN ; End of progam
```

Program II

```
; Demonstration of Action! program
; flow control

PROC MAIN()

BYTE VALUE,
     COUNTER

PRINT("Enter a number: ")
VALUE=INPUTB()


IF VALUE<100 THEN
   PRINTE("That's a small number")
   ELSEIF VALUE=100 THEN
   PRINTE("That's exactly 100!")
   ELSE
   PRINTE("That's a big number!")
   FI

; Note: FI tells Action that the IF
; statement is ended


; Now three ways to print all numbers
; up to the one typed...
; Note that ALL Action! loops are
; contained within DO ... OD lines,
; which makes a loop very easy to
; identify


; *** 1 ***

PUTE() ; Print a Blank line
PRINTE("Using FOR ... NEXT loop")

FOR COUNTER = 1 TO VALUE
   DO
   PRINTB(COUNTER)
   OD


; *** 2 ***

PUTE()
PRINTE("Now using WHILE loop")

COUNTER=1

WHILE COUNTER<=VALUE
   DO
   PRINTB(COUNTER)
   COUNTER=COUNTER+1
   OD

; *** 3 ***

PUTE()
PRINTE("Now using DO ... UNTIL loop")

COUNTER=1

   DO
   PRINTB(COUNTER)
   COUNTER=COUNTER+1
   UNTIL COUNTER>VALUE
   OD


RETURN ;End of program
```

time to calculate – and besides, most programs simply don't use them.

If you do need to use real numbers then a floating point package is available as a set of procedures to include within your programs.

Variables may be defined as BYTE (a value between 0 and 255), CARD (two bytes, a value between 0 and 65535) and INT (two bytes again, but also allowing for negative numbers, −32768 to +32767).

It is also possible to set up arrays of any of these types, or indeed arrays of arrays. A string is defined as an array of characters – or an array of BYTEs to be more accurate.

One of the most powerful features of the Action! language is that variables may be set to point to any location in memory.

You could, for example, define the variable BACKGROUND to be stored at memory location 710, the background colour register. This would be achieved very simply with:

```
BYTE BACKGROUND = 710
```

Programs are mainly made up of loops and conditional statements. These are the equivalent of Basic's FOR ... NEXT and IF ... THEN commands, but you have a lot more flexibility in Action!

Loops may be controlled by the FOR ... NEXT, WHILE and UNTIL statements. Conditional operations are likewise improved with the fundamental IF ... THEN being supplemented by ELSE and ELSEIF. All of these control operations are demonstrated by Program II.

It is interesting to note that there is no direct equivalent to the GOTO statement since all flow control is handled by loops and procedures. This encouranges you to write good, readable software.

If you compare the listing in Program II with a normal Basic program you will probably find the former much easier to read and understand, even though you have probably never seen the language before.

The real power of Action! comes in everyday usage. Things which were complex and unwieldy in Basic can be accomplished with ease and speed in an environment which also encourages you to explore the system's potential in ways that Basic's PEEKs and POKEs prevent.

So powerful is the language that many commercial programs have been written in it – the obvious example being Home Pak, the integrated word processor, database and comms package.

The Action! editor is so flexible and simple to use that it has been used as the core of a number of word processors.

In short, Action! is probably the nearest thing to a perfect programming environment that you are likely to find on the 8 bit Atari, though it is perhaps a little pricey for the pocket money programmer.

It is extremely fast, yet simple to learn and use for everyday applications — though complete mastery will obviously take a little time.

In fact, it is probably a better second language for the advanced Basic programmer than machine code.

Product: Action!
Price: £79.00
Supplier: OSS, c/o Software Express, 514-516, Alum Rock Road, Alum Rock, Birmingham B8 3HX.
Tel: 021 328 3585

A language that offers far more than bare Basic

JOHN ALSBROOKS reviews Kyan Pascal, a package that enables Atari users to greatly broaden their scope

KYAN Pascal from Kyan Software gives you a full Pascal compiler and programming environment which could easily replace Basic as the main language on the 8 bit Ataris.

This implementation of the famous language opens a wide new world to the Atari programmer. Complex data structures, recursion and a host of powerful commands provide you with capabilities Basic could never hope to match.

Pascal was written by Kathleen Jensen and Niklaus Wirth of the Institut fuer Informatik in Zurich and was named after the 17th century mathematician Blaise Pascal.

It was first published in 1971 and then ran only on the Control Data 6000 series of computers, the most powerful of their day.

Jensen and Wirth had as their goal the creation of a new structured general purpose language that would be ideal to teach the concepts of programming as well as suitable for use in commercial software houses.

A structured language, Pascal allows the programmer to write his code in separate building blocks that can be linked together to accomplish a set task. Because of this approach, Pascal programs are also self-documenting.

Anyone knowledgeable in the language should be able to pick up a piece of code and understand what is going on relatively quickly. And the compartmentalisation of tasks reduces the likelihood of changes to one section of code adversely affecting another.

The two keys to Pascal's building block approach are procedures and functions. Both are roughly analagous to the subroutine in Atari Basic but are considerably more powerful in that they allow the use of local variables and recursion.

Local variables have meaning only within a procedure or function, unlike Basic where all variables are global and so can be used anywhere in the code.

Recursion is the ability for a subroutine to call itself repeatedly – a valuable ability in many mathematical problems. Pascal excels at this as its use of local variables allows it to keep track of how deeply it is layered on itself.

By defining your own procedures and functions, you can tailor the language to your specific applications and at the same time build a library of functions and procedures for use in other projects.

When you have Pascal's powerful program control statements such as IF-THEN-ELSE,WHILE, CASE, REPEAT and FOR-TO and the option to define variables and records beyond the character string options of Atari Basic, poor old Basic seems hopelessly limited.

As an example of Kyan Pascal, Program I is a solution to the famous Towers of Hanoi puzzle:

```
program Hanoi (input, output);
    (*Recursively solves the Towers of Hanoi problem.  Moves disks
from A to C.*)

var Height: integer;(*All variables must be defined*)

procedure Move (Height: integer; FromPeg, ToPeg, UsingPeg: char);(*More
variable definitions*)
    (*Recursive procedure for determining moves.*)
    begin
        if Height = 1
            then writeln ('Move a disk from ',FromPeg,' to ',ToPeg)
            else begin
                Move (Height-1,FromPeg,UsingPeg,ToPeg);
                writeln ('Move a disk from ',FromPeg,' to ',ToPeg);
                Move (Height-1,UsingPeg,ToPeg,FromPeg)
            end (*else*)
    end; (*Move*)

begin (*Main Program*)
    writeln ('How many disks are you going to start   with?');
    readln (Height);
    Move (Height,'A','C','B')
end. (*Hanoi*)
```

Program I: Kyan Pascal listing

What exactly do you get when you buy a copy of Kyan Pascal? First of all, you get a standard Pascal, not some unique dialect.

This means that any programs you write, with the exception of those that make use of sound or graphics, should run on any other Pascal system from micro to mainframe.

Perhaps more importantly, the fact that Kyan has produced a package that conforms to the International Standards Organisation (ISO) standard for Pascal means that the vast amount of Pascal code already in existence can be used on your Atari with little or no modification.

You also get a complete Pascal environment, including compiler, editor and macro assembler.

The editor is a very capable part of the package. All the standard cursor controls used in Basic still apply, along with the addition of control codes to allow search and replace, cut and paste and full file manipulation.

If, however, you prefer AtariWriter or some other word processsor, you may write your code on that system for compilation later.

At the heart of Kyan Pascal are the Pascal compiler and the 6502 assembler. The former takes the Pascal source code you write and produces assembly language source

→

code: The assembler then takes the compiler output and produces an executable machine code file.

As a bonus, Kyan has added extensions to the compiler for both sound and graphics, as well as random file access – capabilities not normally supported in other Pascals.

Nothing is perfect, but my only complaint is that the compiler is painfully slow. Program I takes 95 seconds to compile and makes the disc drive whir and grind like a 1961 Morris Minor running without oil. Even loading the compiler takes over 25 seconds.

There is some respite, however, if you own a 130XE. You may load the compiler, source code, standard library and so on into the ramdisc. Loading now takes less than three seconds and compile times are cut in half.

There is nothing wrong with the code the compiler produces though. Unlike some other versions of Pascal for micros (which produce an interpreted language known as p-code), the Kyan package produces native 6502 machine code which runs extremely quickly – some five to ten times faster than Atari Basic.

If this increase isn't enough for you, Kyan has thoughtfully allowed the programmer to place assembly language routines right in the middle of his program. I found this feature a lot easier to use than thrashing about with the Assembler/Editor cartridge.

A little bit less than 27k of ram is available for your program and so far nothing I have written has come close to using up even half the available memory.

In the event that you need to write a program that would exceed the size of your computer's memory, you can chain two or more programs together and allow them to share variables between them as they execute.

The documentation that comes with Kyan Pascal is extremely good. The 274 page manual contains sections on using the package, assembly language programming and an excellent tutorial that leads you by the hand as you explore the capabilities of Pascal. Additionally, there is a comprehensive index, something all too rare nowadays.

There is also an optional bi-monthly newsletter available from Kyan with articles on Pascal and assembler programming, handy procedures and functions to add to your own library, and a forum for users' letters and questions.

Kyan Pascal comes on both sides of a single density, unprotected disc. Included with the compiler, editor and assembler are Dos 2.5, utility files and a few example Pascal programs (both source and object). It will run on all 8 bit Ataris with 48k or more ram.

Kyan Pascal is a real Pascal. It puts you on a par with every other Pascal user and broadens your scope beyond Atari Basic. I highly recommend it.

Product: Kyan Pascal
Price: $89.95 (£58).
Supplier: Kyan Software, 1850 Union Street 183, San Francisco CA 94123, USA.

TEXT and graphics cannot be easily mixed on an 8 bit Atari. This is because, unlike the ST range, it does not have a bit mapped text screen.

Display lists can be used to good effect, but this puts certain constraints on the programmer as they cannot be displayed on the same horizontal line – only farther down the screen.

To overcome these problems I have written a machine code routine which also has two additional features – Different text sizes and the ability to have the foreground and background in any colour.

The Write routine is called by using:

A=USR(ADR(WRITE$),XPOS, YPOS,INK,PAPER,XSCALE, YSCALE,ADR("TEXT"),NUMCHS)

Mixing it with text and graphics

RICHARD PARKES gets round that bit mapped text screen snag

WRITE$ contains the machine code program.

XPOS and **YPOS** are the x and y coordinates of where to start printing the text.

INK is the text colour and **PAPER** is the background colour of the characters.

XSCALE and **YSCALE** define the size of the characters. These have a maximum value of 255 but are limited by the number of pixels on the screen.

NUMCHS is the number of characters to be displayed.

The text between the quotes is printed in the desired colour and size at the requested position.

Type in the program up to and including line 140 and then LIST it to disc or tape. You can then easily merge the Write routine into your own programs using the ENTER command.

Now type in the rest of the listing which is a demonstration program to show you what the Write routine can do.

If you have any difficulty typing Write in, you can check it using Get It Right!, our checksum program, or you can download it from MicroLink.

```
5 REM BASIC WRITE$ DATA PROGRAM
10 DIM WRITE$(340):FOR J=1 TO 340:READ
 A:WRITE$(J)=CHR$(A):NEXT J
20 DATA 169,0,141,255,6,104,201,8,240,
14,160,1,10,170,240,4,104,202,208,252,
140,255,6,96,160,141,104,141
30 DATA 243,6,104,141,242,6,104,240,4,
169,13,208,228,104,141,244,6,104,104,1
41,245,6,104,104.141,246,6
40 DATA 104,240,4,169,7,208,207,104,14
1,247,6,104,240,4,169,5,208,196,104,20
8,5,168,169,4,208,188,141,248
50 DATA 6,104,133,206,104,133,205,104,
141,249,6,104,141,250,6,173,244,6,141,
252,6,173,249,6,13,250,6,208
60 DATA 1,96,169,255,141,251,6,173,250
,6,56,233,1,141,250,6,176,3,206,249,6,
160,0,177,205,10,144,3,140
70 DATA 251,6,74,201,96,176,10,201,32.
144,4,233,32,176,2,105,64,172,244,2,13
2,204,162,3,10,144,8,72,138
80 DATA 24,101,204,133,204,104,202,208
,242,133,203,160,0.152,72,173,242,6,14
1,253,6,173,243,6,141,254,6
90 DATA 173,252,6,141,241,6,177,203,77
,251,6,162,8,240.143,10,72,169,0,208,2
21,42,168,185,245,6,141,251
100 DATA 2,138,72,24,173,253,6,133,85,
109,247,6,141,253,6,173,254,6,133,86,1
05,0,141,254,6,172,248.6.162
110 DATA 2,189,252,6,149,90,202,16,248
,133,84,152.72,162,96,169,17,157,66.3,
240,190,32,86,228,48,52,238
120 DATA 252,6,104,168,136,208,220,104
,170,104,202,240,9,172,241,6,140,252,6
,24,144,164,104,168,200,192
130 DATA 8,208,161,230,205,208,2,230,2
06,173,253,6,141,242,6,173,254,6,141,2
43,6.169,0,240,197,140,255,6
140 DATA 104,104,104,104,96
480 REM WRITE$ EXAMPLE PROGRAM
490 REM (TO BE TYPED IN AFTER WRITE$
  DATA PROGRAM)
500 TRAP 32760:GRAPHICS 11:SETCOLOR 4,
0,12
510 DIM A$(15):A$="ATARI USER"
520 FOR J=1 TO 10
550 A=USR(ADR(WRITE$),(J-1)*8,6,J,J+4,
1,4,ADR(A$(J)),1):IF PEEK(1791)<>0 THE
N A=LOG(0)
560 NEXT J
570 FOR J=1 TO 500:NEXT J
580 FOR J=0 TO 14:SETCOLOR 4,0.J:FOR I
=1 TO 100:NEXT I:NEXT J
590 GRAPHICS 9+32:FOR J=0 TO 15:SETCOL
OR 4,J,0:FOR I=0 TO 200:NEXT I:NEXT J:
SETCOLOR 4,12,0
600 FOR J=1 TO 500:NEXT J
610 FOR J=2 TO 5
620 FOR Y=6 TO 6+(J-1)*8 STEP 2
630 A=USR(ADR(WRITE$),(J-1)*8,Y,J,J+4,
1,4,ADR(A$(J)),1):IF PEEK(1791)<>0 THE
N A=LOG(0)
640 NEXT Y:NEXT J
650 A=USR(ADR(WRITE$),40.6,0.0,1,4.ADR
("     "),5):IF PEEK(1791)<>0 THEN A=L
OG(0)
660 FOR J=7 TO 10
670 A=USR(ADR(WRITE$),(J-6.5)*8,8*J+8,
J,J+4,1,4,ADR(A$(J)).1):IF PEEK(1791)<
>0 THEN A=LOG(0)
680 NEXT J
690 A=USR(ADR(WRITE$),44,70,0,15,1,3,A
DR("DEMO").4):IF PEEK(1791)<>0 THEN A=
LOG(0)
700 A=USR(ADR(WRITE$),4.140,2,6,1,2,AD
R("PRESS ESC"),9):IF PEEK(1791)<>0 THE
N A=LOG(0)
710 GOSUB 6000
720 GRAPHICS 8+16+32:SETCOLOR 2,0,0:FO
R J=1 TO 400:NEXT J
730 GOSUB 6000
740 GRAPHICS 7+16
750 DIM TEXT$(50):TEXT$="The routine c
an be used for labelling graphs"
760 CPL=19:X=4:Y=4:INK=1:PAPER=2:XSCAL
E=1:YSCALE=2:GOSUB 7000
770 TEXT$="An example follows":CPL=18:
X=4:Y=55:INK=3:PAPER=4:XSCALE=1:YSCALE
=1:GOSUB 7000
780 TEXT$="Press 'Esc'":CPL=11:X=32:Y=
70:INK=2:PAPER=1:XSCALE=1:YSCALE=1:GOS
UB 7000
790 GOSUB 6000
800 GRAPHICS 8+16:COLOR 1:PLOT 17.10:D
RAWTO 17,170:PLOT 17,95:DRAWTO 313,95
810 DEG :PLOT 17,95:FOR J=0 TO 452 STE
P 10:DRAWTO J*2/3+16,95-SIN(J)*75:NEXT
 J
820 A=USR(ADR(WRITE$),3,10,1,0,1,1.ADR
("1"),1):IF PEEK(1791)<>0 THEN A=LOG(0
)
830 A$="y axis":FOR J=1 TO LEN(A$)
840 A=USR(ADR(WRITE$),3,J*8+54,1,0,1.1
,ADR(A$(J)),1):IF PEEK(1791)<>0 THEN A
=LOG(0)
850 NEXT J
860 A=USR(ADR(WRITE$),0,163.1,0.1.1,AD
R("-1"),2):IF PEEK(1791)<>0 THEN A=LOG
(0)
870 A=USR(ADR(WRITE$),67,98,1.0,1,1.AD
R("90"),2):IF PEEK(1791)<>0 THEN A=LOG
(0)
880 A=USR(ADR(WRITE$),191,98,1,0,1.1,A
DR("270"),3):IF PEEK(1791)<>0 THEN A=L
OG(0)
```

```
900 A=USR(ADR(WRITE$),270,100,1,0,1,1,
ADR("x axis"),6):IF PEEK(1791)<>0 THEN
 A=LOG(0)
910 A=USR(ADR(WRITE$),40,0,1,0,3,2,ADR
("SINE CURVE"),10):IF PEEK(1791)<>0 TH
EN A=LOG(0)
920 A=USR(ADR(WRITE$),30,140,1,0,1,1.A
DR("y=sin(x)"),8):IF PEEK(1791)<>0 THE
N A=LOG(0)
930 A=USR(ADR(WRITE$),200,180,0,1,1,1.
ADR("Press 'Esc'"),11):IF PEEK(1791)<>
0 THEN A=LOG(0)
940 GOSUB 6000
950 FOR J=9 TO 11:GRAPHICS 32+J:GOSUB
6000:NEXT J
960 GRAPHICS 8+16:TEXT$="FULL ATASCII
CHARACTER SET":CPL=40:X=52:Y=0:XSCALE=
1:YSCALE=2
970 INK=1:PAPER=2:GOSUB 7000
980 FOR J=0 TO 7:FOR X=0 TO 31
990 A=USR(ADR(WRITE$),X*10+1,24+J*10,1
,0,1,1,ADR(CHR$(J*32+X)),1):IF PEEK(17
91)<>0 THEN A=LOG(0)
1000 NEXT X:NEXT J
1010 REM XE ONLY LINES 1020 TO 1040
1020 POKE 756,204:FOR J=0 TO 7:FOR X=0
 TO 31
1030 A=USR(ADR(WRITE$),X*10+1,104+J*10
,1,0,1,1,ADR(CHR$(J*32+X)),1):IF PEEK(
1791)<>0 THEN A=LOG(0)
1040 NEXT X:NEXT J
1050 FOR J=1 TO 1000:NEXT J
1060 GRAPHICS 8+16
1070 A=USR(ADR(WRITE$),40,10,1,0,10,10
.ADR("THE").3):IF PEEK(1791)<>0 THEN A
=LOG(0)
1080 A=USR(ADR(WRITE$),40,100,1,0,10,1
0,ADR("END"),3):IF PEEK(1791)<>0 THEN
A=LOG(0)
1090 GRAPHICS 10+32
1100 GOTO 1100
5999 END
6000 POKE 764,255
6010 IF PEEK(764)<>28 THEN GOTO 6010
6020 RETURN
7000 FC=1:FOR J=1 TO LEN(TEXT$)
7010 IF TEXT$(J,J)=" " THEN TS=J
7020 IF J-FC<>CPL THEN 7050
7030 A=USR(ADR(WRITE$),X,Y,INK,PAPER,X
SCALE,YSCALE,ADR(TEXT$(FC)),TS-FC):IF
PEEK(1791)<>0 THEN A=LOG(0)
7040 FC=TS+1:Y=Y+YSCALE*8
7050 NEXT J
7060 A=USR(ADR(WRITE$),X,Y,INK,PAPER,X
SCALE,YSCALE,ADR(TEXT$(FC)),J-FC):IF P
EEK(1791)<>0 THEN A=LOG(0)
7070 RETURN
32760 GRAPHICS 0:? :? "Error- ";:IF PE
EK(1791)<>0 THEN ? PEEK(1791);:GOTO 32
762
32761 ? PEEK(195);
32762 ? " at line ";PEEK(186)+PEEK(187
)*256:END
```

Get it right!

LINE	CHSUM	LINE	CHSUM	LINE	CHSUM
5	6093	10	11474	20	15068
30	14959	40	15405	50	15044
60	15030	70	15011	80	14965
90	15062	100	15163	110	15290
120	15000	130	15125	140	3695
480	5301	490	9684	500	7344
510	4679	520	2270	550	14242
560	1347	570	3895	580	10629
590	16519	600	3895	610	2093
620	4524	630	14347	640	2856
650	13232	660	2288	670	15443
680	1347	690	13917	700	14704
710	1940	720	9873	730	1940
740	2495	750	16340	760	11289
770	18719	780	16142	790	1940
800	13361	810	13617	820	13059
830	5825	840	13874	850	1347
860	12920	870	13023	880	13363
900	14427	910	15307	920	14966
930	16214	940	1940	950	8232
960	15828	970	4854	980	4660
990	16257	1000	2854	1010	5386
1020	7112	1030	16533	1040	2854
1050	3994	1060	2496	1070	13708
1080	13923	1090	2719	1100	1851
5999	836	6000	2121	6010	5507
6020	1498	7000	5018	7010	4737
7020	3970	7030	19507	7040	4136
7050	1347	7060	19082	7070	1498
32760	13334	32761	2051	32762	7228

More £25 winners!

Send your five-liners in to us at: Five-liners, Atari User, Europa House, 68 Chester Road, Hazel Grove, Stockport SK7 5NY.

256 COLOURS from MARK RILEY

THIS clever program produces 256 colours on the screen without using the usual Display List Interrupts. It merges colours to produce the large number displayed.

Line Breakdown

- **10** Sets the screen to graphics mode 11 and starts the main loop.
- **20** Draws the horizontal lines.
- **30** Sets the colours of the vertical lines.
- **40** Draws the vertical lines.
- **50** Loops back to line 50 so that the screen remains unaltered.

```
10 GRAPHICS 11:FOR A=8 TO 160 STEP 2:C
OLOR A*(16/160)
20 PLOT 9,A:DRAWTO 70,A:NEXT A
30 FOR A=9 TO 70:COLOR A*(15/70)
40 FOR B=9 TO 156 STEP 2:PLOT A,B:NEXT
B:NEXT A
50 POKE 77,0:GOTO 50
```

Get it right!

LINE CHSUM	LINE CHSUM	LINE CHSUM
10 9139	20 5373	30 5174
40 8581	50 3247	

AUTO BOOT CASSETTE from STEPHEN HILL

IF you've ever wanted to create auto-run cassettes or discs, then this five-liner could be the answer. It will create a file from a machine code program which will load on power up. To create an auto-run disc, you will have to change the OPEN command in line 40 to:

OPEN #1,8,128,"D:AUTORUN.SYS"

and change the second PUT command to:

PUT #1,255

If you are using a cassette, you must press the Start key as you turn the computer on so that the program will auto-run.

Line Breakdown

- **10** Sets up screen.
- **20** Inputs the start and end addresses and calculates the header bytes.
- **30** The start and end addresses are converted in their high and low components.
- **40** A save file is created and the header bytes are written to it.
- **50** The contents of the memory block are written to the cassette or disc.

```
10 GRAPHICS 0:POKE 752,1:POKE 710,50:P
OKE 712,100:POSITION 6,3:? "MEMORY TO
AUTO-BOOT CASSETTE"
20 ? :? "START ADDRESS:";:INPUT START:
? :? "END ADDRESS:";:INPUT EDA:START=S
TART-6:X=START
30 SHI=INT(X/256):SLO=(X-(SHI*256)):X=
EDA:EHI=INT(X/256):ELO=(X-(EHI*256)):P
=(INT(EDA-START)/128):IF P<1 THEN P=1
40 CLOSE #1:OPEN #1,8,128,"C:":PUT #1,
255:PUT #1,P:PUT #1,SLO:PUT #1,SHI:PUT
 #1,ELO:PUT #1,EHI
50 FOR X=START TO EDA:Q=PEEK(X):PUT #1
,Q:NEXT X:CLOSE #1:END
```

Get it right!

LINE CHSUM	LINE CHSUM	LINE CHSUM
10 17363	20 17674	30 20387
40 16104	50 11259	

CONTROL LINE from HASSAN MEHMET

THIS small routine adds a 25th line at the top of the screen using display list interrupts. Even if you don't know anything about DLIs, you can easily incorporate Control Line in your own programs.

Line Breakdown

- **10** Gets the DLI address and the low and high screen pointers.
- **20** Reads the data for the DLI and POKEs it in.
- **30** Puts the text into the control line.
- **40** Repositions cursor and screen pointer.
- **50** DLI data.

```
10 GRAPHICS 0:DL=PEEK(560)+256*PEEK(56
1):SLO=PEEK(88):SHI=PEEK(89):PH=PEEK(8
4):PV=PEEK(85):POKE 559,0
20 FOR I=DL-3 TO DL+2:READ DAT:POKE I,
DAT:NEXT I:DL=DL-3:HI=INT(DL/256):LO=D
L-HI*256
30 POKE 560,LO:POKE 561,HI:POKE 559,34
:POKE 88,0:POKE 89,6:POSITION 0,0:? "S
CORE 0000       HI 5000       PLAYER  2"
40 POKE 84,PH:POKE 85,PV:POKE 88,SLO:P
OKE 89,SHI
50 DATA 112,80,66,0,6,16
```

Get it right!

LINE CHSUM	LINE CHSUM	LINE CHSUM
10 18185	20 15011	30 19070
40 8766	50 3356	

MAGIC NUMBERS from ROGER WILLIAMS

MAGIC squares have been of interest to mathematicians for centuries. The magical property of a magic square is that each column, row and diagonal adds up to the same number. This small program creates magic number squares quickly and simply.

Line Breakdown

- **1** Inputs the number of rows in the square and initialises the main array.
- **2** Sets up the main loop for row by row calculation and calculates the elements on the diagonals of the square.
- **3** Calculates column elements adjacent to the top left/bottom right diagonal.
- **4** Calculates column elements adjacent to the top right/ bottom left diagonal.
- **5** Increments the main loop until completion and then displays the square.

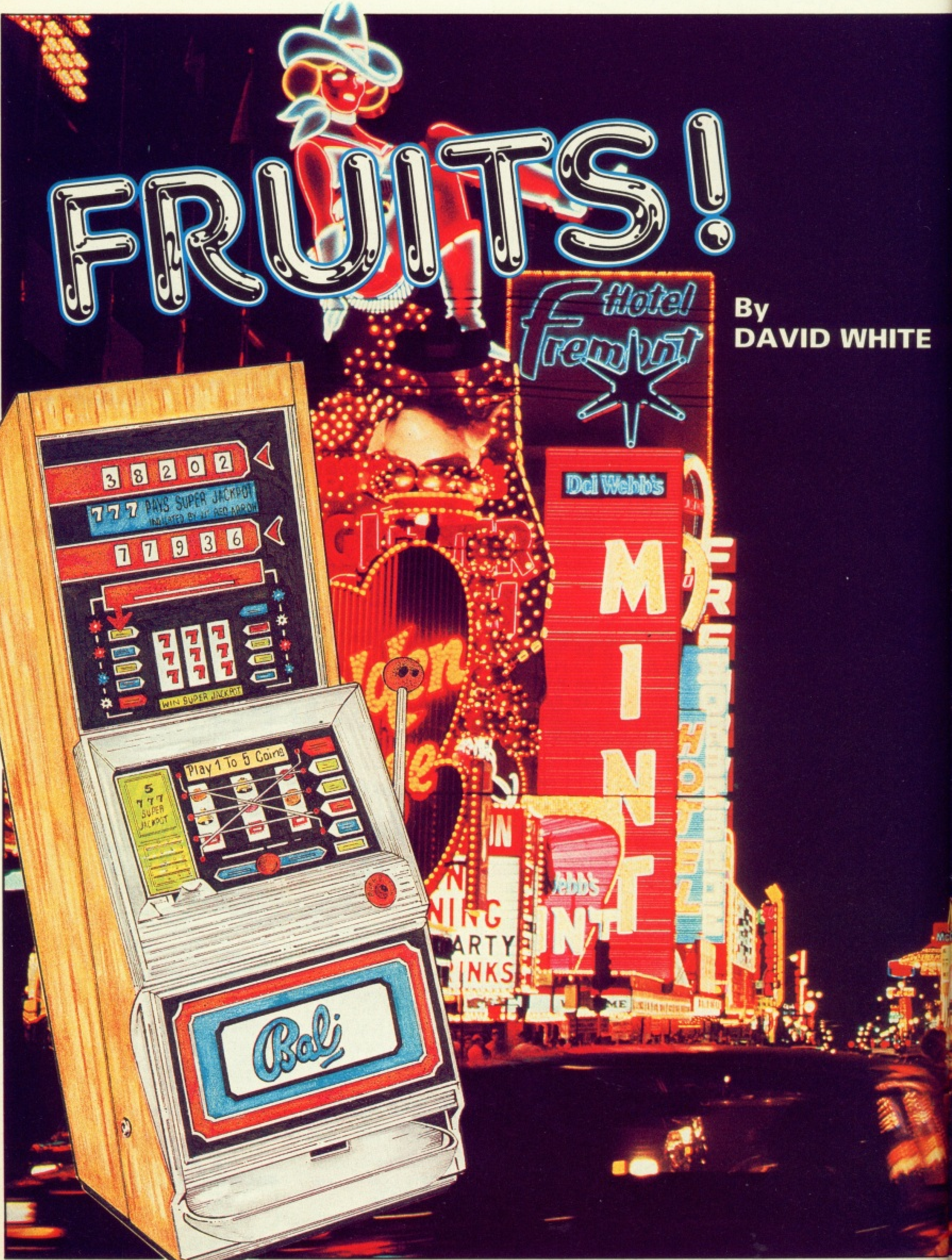
```
1 ? "ENTER EVEN ORDER OF SQUARE";:INPU
T N:DIM A(N*N):FOR I=1 TO N*N:A(I)=I:N
EXT I:B=N/2:C=INT(N/4)
2 FOR I=1 TO B:P=(I-1)*(N+1)+1:Q=(N-I)
*(N+1)+1:R=I*(N-1)+1:S=(N-I)*N+I:A(P)=
Q:A(Q)=P:A(R)=S:A(S)=R
3 ON N<5 GOTO 5:FOR J=1 TO B-C-1:D=B*(
(I+J)>B):E=J-D:F=(J-D)*N:A(P+E)=S+E:A(
S+E)=P+E:A(P+F)=R+F:A(R+F)=P+F:NEXT J
4 ON N<7 GOTO 5:FOR J=1 TO C-1:D=B*((I
+J)>B):E=J-D:F=(J-D)*N:A(R-E)=Q-E:A(Q-
E)=R-E:A(S-F)=Q-F:A(Q-F)=S-F:NEXT J
5 NEXT I:FOR I=1 TO N:PRINT "ROW";I;"=
";:FOR J=1 TO N:? A((I-1)*N+J);":";:NE
XT J:? :NEXT I
```

Get it right!

LINE CHSUM	LINE CHSUM	LINE CHSUM
1 18158	2 16590	3 19907
4 19727	5 16405	

FRUITS!

By
DAVID WHITE



FRUIT machine programs will never be the same again once you've seen Fruits. With graphics which would put many an arcade fruit machine to shame, this month's type-in game will let you gamble your time away, but still leave the contents of your wallet intact.

Using an impressively redesigned character set, Fruits turns your 8 bit Atari into a one armed bandit complete with sound effects, nudge controls, smooth scrolling windows and a separate score screen.

Type in Listing I. If you use a cassette for storage, then make the changes given in Listing II making sure to delete line 2600. Be sure to save the program to disc or tape before you run it.

Now place a newly formatted disc in the drive or blank cassette in cassette deck and RUN Fruits. An auto-run version will be placed on the disc or cassette. It will take about 10 minutes to complete, then the normal Ready message will appear on the screen.

If you get an error message, check the offending line. An error message in line 32768 means that you will have to check the DATA statements carefully.

You can now run Fruits by placing the disc in the drive or tape in the cassette deck and booting your computer without Basic.

If you have any problems typing in Fruits, you can check it using our checksum program Get It Right! which was last published in the August 1986 issue of *Atari User*. Alternatively you can download Fruits from MicroLink.

Happy gambling!



Listing I

```
10 REM FRUITS
20 REM ATARI USER - MARCH '87
30 OPEN #1,8,0,"D:AUTORUN.SYS":TRAP 60
:CH=0:XCH=907931
40 READ A:IF A>=0 THEN PUT #1,A:CH=CH+
A:GOTO 40
50 READ B:FOR C=1 TO -A:PUT #1,B:CH=CH
+B:NEXT C:GOTO 40
60 CLOSE #1:IF CH<>XCH THEN ? "DATA ER
ROR - LINE ";PEEK(183)+256*PEEK(184)
70 DATA 255,255,128,101,247,138
80 DATA -8,0,-64,255,-39,0,-8,255,-17,
0,-8,255,-24,194,231,-23,194,-8,255,-6
4,0,-8,255,-24,16,57,-23,16,-8,255
90 DATA -64,0,-8,255,-24,195,231,-23,1
95,-8,255,-64,0,-64,255,-39,0,-8,255,-
17,0,3,12,1,21,21,-3,85,192,48,64
100 DATA 84,148,101,89,85,-8,0,1,1,5,5
,21,21,0,0,-6,85,3,3,-6,85,192,192,64.
64,80,80,84,84,-3,0,255,255.0,63,48
110 DATA 48,63,0,255,255,0,3,204,204,1
5,0,255,255,0,195,51,51,243,0,255,255,
0.240,12,12,240,-3,48,63,0,255,255,0
120 DATA -3,204,12,0,255,255,0,-4,51,0
,255,255,0,192,48,12,12,0,255,255,-3,0
,5,16,-4,64,0,85,0,42,42,0,2,10,0,85
130 DATA 0,-3,168,160,128,0,0,80,4,-4,
1,-4,64,16,5,0,0,-4,10,0,0,85,-7,0,85,
0,-4,1,4,80,-21,0,3,3,15,63,63,5,61
140 DATA -5,255,252,-4,0,3,63,255,127,
0,3,15,-4,255,240,-5,255,252,192,0,252
,240,240,192,-9,0,3,15,63,-4,0,3,-3
150 DATA 255,3,0,63,-5,255,240,28,28,2
40,240,-3,252,-5,255,63,63,3,-14,255,2
52,192,240,-4,192,-3,0,3,3,0,0,10.41
160 DATA 37,165,192,240,241,5,161,106,
170,170,15,63,252,64,74,-3,170,-3,0,12
8,160,168,168,170,169,-4,170,42,42,2
170 DATA 106,-20,170,168,168,128,-4,0,
-3,3,15,0,15,63,240,-3,192,255,0,255,2
55,-4,0,192,-8,0,15,-4,3,63,63,0,255
180 DATA -4,192,255,255,0,192,-4,0,255
,255,-18,0,240,252,60,1,1,4,16,0,1,4,1
9,67,64,80,4,0,64,0,192,240,240,-3,0
190 DATA 2,10,41,42,10,2,0,128,160,104
,170,106,168,160,0,0,2,10,42,42,10,2,0
,128,160.168,170,170,168,160,-4,0,3
200 DATA 15,15,63,63.0,0,63,252,-4,255
,0,255,195,15,-4,255,0,252,-6,255,63,-
5,255,63,0,-7,255,0,-5,255,252,192,0
```

→

ATTENTION ALL 1050 DISK DRIVE OWNERS!!

Announcing the all new ULTIMATE drive enhancement

This Drive enhancement consists of a plug-in PCB, which can easily by fitted with our simple to follow instructions.
The 1050 IS PLATE Disk Drive enhancement offers many features never before available in one UNIT:

- Improved Drive speeds – up to TWICE normal loading speeds (Depending on disk format used).
- Reduction of Drive WEAR and TEAR: now whole tracks can be stored in the internal 16k RAM.
- The IS PLATE can READ/WRITE a whole track in the time it takes a standard 1050 drive to READ/WRITE a single sector (up to FIVE times standard speed).
- Supports double, Dual and Single Densities.
- Sector SKEW is now no longer required to obtain Hi-speed as with US Doublers.
- Other Special features are: Slow down, Fast write, Fast read, Drive write lock, Skew on/off, Fast formatting.
- Fast write with verify. This system is faster than other systems which write without verify.
- A double sided operating system disk is supplied which offers the following:
  - IS Doubler, US Doubler, Standard 1050 and Archiver emulation.
  - Track Tracer, Diagnostic tester, 48k and 128k Disk Backup utilities.
- The PLATE can be made invisible to software detection by either Slow down or 1050 emulation.
- Supplied with detailed information regarding software drive control to allow you to access the full potential of the PLATE.
- Will run all available disk operating systems (Dos) including: Spartados, Happy warp speed Dos, and other HIGH speed systems.
- With this system, up to sixteen drives can be connected and used.
- A comprehensive 30 page bound manual is supplied. This includes fitting instructions.
- All registered owners will be supplied with any software updates etc for the price of Disk and return postage.
- **All this is available for ONLY £99.95 inc post/packing and Twelve months guarantee. Whilst every effort is made to ship the product by return, please allow 21 days for delivery.**

Now available exclusively for the Ultimate Drive Enhancement:

THE ISP GREMLIN GRABBER

The comprehensive hi-speed back-up utility disc, complete with manual Price: £14.95 inc P&P

NEW **GREMLIN GRABBER II**

(Existing owners please contact manufacturers for update)

CHIPS

53 Rugby Road, West Worthing, Sussex BN11 5NB
Tel: (0903) 40509 (24hrs)
(0903) 503711 (Bulletin Board 300/300 24hrs)

HSV COMPUTER SERVICES LIMITED

All our prices include carriage & VAT – No extras to pay!

CONTINUOUS STATIONERY	QTY 250	500	1000	2000
9.5" X 11" 60 GSM Micro Perf All Edges	£2.95	£4.95	£8.95	£14.95
TRUE A4 90 GSM Micro Perf All Edges	£5.25	£8.75	£14.95	—
TRUE A4 100 GSM VELLUM Micro Perf All Edges	£6.50	£9.95	£16.25	—
TRUE A4 100 GSM VELLUM Micro Perf All Edges (Cream, Blue or Grey	£7.25	£13.50	£25.50	—
LABELS 3.5" X 1.5" (1 across)	—	£2.95	£4.95	£9.50
LABELS 4.0" X 1.5" (1 across)	—	£3.25	£5.50	£10.50
LABELS 4.0" X 1.5" (2 across)	—	£3.75	£6.50	£11.95
LABELS 2.75" X 1.5" (3 across)	—	£2.75	£4.50	£8.50

PRINTER RIBBONS	EACH		EACH
CANON PW1080/1186	£3.25	PANASONIC KXP 1090	£4.75
EPSON FX/MX/RX80	£3.25	SEIKOSHA GP80	£2.75
EPSON LX80	£3.25	SEIKOSHA GP100	£3.75
EPSON MX100	£3.25	SHINWA CP80	£4.75
JUKI 6100 S/S	£1.75	STAR SG10 /SG15	£1.75
JUKI 6100 M/S	£2.75	TAXAN KAGA	£3.25
MANNESMANN TALLY MT80/80+	£4.75	WALTERS WM80	£4.75
OKI MICROLINE 80/82/83	£1.75	WALTERS WM2000/4000	£4.75

StorageMaster **DISKETTES (Boxed in 10's)**

3.5" SS/DD 135 TPI 80 TRACK	£24.95	5.25" SS/DD 48 TPI 40 TRACK	£12.95
3.5" DS/DD 135 TPI 80 TRACK	£32.95	5.25" DS/DD 48 TPI 40 TRACK	£16.95
		5.25" DS/QD 96 TPI 40 TRACK	£19.95

UNBRANDED LIFETIME GUARANTEE

		QUANTITY	10	20	30	40	50	100
3.5	SS/DD	135TPI	15.50	30.50	45.50	60.50	75.50	149.50
	DS/DD	135TPI	17.50	34.50	51.50	68.50	85.50	169.50
	SS/DD	48TPI	5.95	11.50	16.95	22.50	27.95	54.95
5.25	DS/DD	48TPI	6.95	13.50	19.95	26.50	32.95	64.95
	DS/QD	96TPI	7.95	15.50	22.95	30.50	37.95	74.95

ALL DISKS SUPPLIED IN CARDBOARD BOXES WITH WRITE PROTECT TABS, LABELS AND ENVELOPES AND COME WITH OUR NO QUIBBLE MONEY BACK OR REPLACEMENT GUARANTEE.

DISKETTE STORAGE BOXES	EACH
50 X 5.25" HINGED LID	7.95
50 X 5.25" HINGED LID LOCKABLE	8.95
100 X 5.25" HINGED LID LOCKABLE	13.95
40 X 3.5" HINGED LID LOCKABLE	9.95
30 X 3.5" HINGED LID	8.95
80 X 3.5" HINGED LID LOCKABLE	13.95

CREDIT CARD HOT LINE!

(0256) 463507

VISA

HSV COMPUTER SERVICES LIMITED,
40-42 NEW MARKET SQUARE,
BASINGSTOKE,
HANTS RG21 1HS

Data Preparation *Computer Supplies*

HSV

```
210 DATA 255,252,252,240,192,-4,0,221,
119,0.12,60,12,12,0,221,119,0,3,12,48.
48,0,221,119,0,192,48,12,12,0,221
220 DATA 119,-3,0,240,204,-3,12,63.0,2
21,119,0,48,48,12,3,0,221,119,0,12,12,
48,192,0,221,119,0,204,240,192,192,0
230 DATA 221,119,-5,0,10,-3,42,60,3,0,
170,166,170,105,170,60,60,64,170,154,1
70,166,170,-4,0,160,168,152,168,42
240 DATA 41,42,10,2,-3,0,154,170,166,1
05,170,154,42,10,105,170,154.166.170,1
06,168,160,168,152,104,160,128.-8.0
250 DATA 5,20,20,-5,0,80,-4,20,5,-5.0,
20,20,80,-10,0,1,5,1,-5,0,-3,64,1,1,21
,-5,0,64,64,84,-10,0,5,20,-6,0,80,20
260 DATA 80,1,5,21,-5,0,64,0,84,-10.0,
21,0,1,-5,0,84,80,64,0,20,5,-5,0,80,20
,80,-11,0,1,5,-5,0,-3,80,20,21,-6,0
270 DATA 80,84,80,-10,0,21,20,21,-5.0,
84,0,80,0,20,5,-5,0,20,20,80.-10,0,5,2
0,21,-5,0,80,0,80,20,20,5,-5,0,20,20
280 DATA 80,-10,0,21,-7,0,84,20,80,1,5
,5,-5,0,64,-12,0,5,20,5,-5,0,80,20,80,
20,20,5,-5,0,20,20,80,-10,0.5,20,5
290 DATA -5,0,80,20,84,0,0,5,-5,0,20,8
0,64,-69,0,174,174,168,236,236,168,174
,174,140,140,-4,138,236,236,-3,10,14
300 DATA 14,-3,10,232,232,136,200.200,
136,238,238,192,192,-4,160,192,192,-3,
0,255,255,-8,0,24,24,0,0,128,-4,0
310 DATA 128,0,0,60,102.110,118,102,60
,0,0,24,56,-3,24,126,0,0,60,102,12,24,
48,126,0,0,126,12,24,12,102,60.0,0
320 DATA 12,28,60,108,126,12,0,0,126.9
6,124,6,102,60,0,0,60.96,124.102,102,6
0,0,0,126,6,12,24,48,48,0,0,60,102
330 DATA 60,102,102,60,0.0,60,102,62,6
,12,56,0,0,74,106,122,90,74,75,0,0,92,
86,82,82,86,220,0,0,247,132,134.180
340 DATA 148,247.-3,0,126,0,0,126,-3,0
,188,32,60,4,4,188,0,240,129,131,-3,12
9,135,240,15,-5,129,225,15,0.24,60
350 DATA 102,102,126,102,0,0,124,102,1
24,102,102,124,0,0,60,102,96,96,102,60
,0,0,120,108,102,102,108,120,0,0,126
360 DATA 96,124,96,96,126.0,0,126,96,1
24,-3,96,0,0,62,96,96,110,102,62.0,0,1
02,102,126,-3,102,0,0,126,-4,24,126
370 DATA 0,0,-4,6,102,60,0,0,102,108,1
20,120,108,102,0,0,-5,96,126,0,0,99,11
9,127,107,99,99,0,0,102,118,126,126
380 DATA 110,102,0,0,60,-4,102,60,0.0,
124,102,102,124,96,96,0,0,60,-3,102,10
8,54,0,0,124,102,102,124,108,102,0,0
390 DATA 60,96,60,6,6,60,0,0,126,-5,24
,0,0,-5,102,126,0,0,-4,102,60,24.0,0,9
9,99,107,127,119,99,0,0,102,102,60
400 DATA 60,102,102,0,0,102,102,60,-3,
24,0,0,126,12,24,48,96,126,0,15,-6.8,1
5,0,60,102,12,24,48,126,0,240,-6,16
410 DATA 240,240,135,128,129,128,134.1
31,240,15,225,193,129,193,97,193,15,42
.183,151,-5,183,42,151,157,181,183
420 DATA 159,159,181,42.151,189,183,15
1,189,189,151,42,-3,159,157,149,181,18
9,42,149,159,159,151,189,183,151,42
430 DATA 181,159,159,151,157,157,183,4
2,149,189,189,183,183,159,159,42,183,1
57,157,183,157,157,183,42,183,157
440 DATA 157,181,189,189,151,42,183,15
1,-5,183,170,247,-5,221,247,42,183,151
,-5,183,170,247,215,-5,247,42,183
450 DATA 151,-5,183,170,215,221,245,24
7,223,223,245,42,183,151,-5,183,170,21
5,253,247,215,253,253,215,42,183,151
460 DATA -5,183,170,-3,223,221,213,245
,253,42,183,151,-5,183,170,213,223,223
,215,253,247,215,42,183,151,-5,183
470 DATA 170,245,223,223,215,221,221,2
47,42,183,151,-5,183,170,213,253,253,2
47,247,223,223,42,183,151,-5,183,170
480 DATA 247,221,221,247,221,221,247,4
2,183,151,-5,183,170,247,221,221,245,2
53,253,215,42,151,157,181,183,159
490 DATA 159,181,170,247,-5,221,247,17
0,-7,255,160,-7,248,-7,191,42,255,15,3
,12,15,15,255,170,255,-3,195,3,195
500 DATA 255,170,-7,248,160,191,131,14
0,131,143,143,191,42,255,243,-3,204,24
3,255,170,255,207,207,204,195,207
510 DATA 255,170,248,-3,200,8,200,248,
160,-7,191,42,-7,255,170,-7,248,160,0,
56,-4,24,60,-3,0,102,127,127,107,99
520 DATA -3,0,124,-4,102,-3,0,60,-3,10
2,60,-3,0,124,102,102,124,96,96,0,0,62
,102,102,62,6,6,0,0,124,102,-3,96,-3
530 DATA 0,62,96,60,6,124,0,0,24,126,-
3,24,14,-3,0,-4,102,62,-3,0,-3,102,60,
24,-3,0,99,107,127,62.54,-3,0,102,60
540 DATA 24,60,102,-3,0,-3,102,62,12.1
20,0,0,126,12,24,48,126,0,0,24,60.126,
126,24,60,0,-8,24,0,126,120,124,110
550 DATA 102,6,0,8,24,56,120,56,24,8,0
.16,24,28,30,28,24,16,0,33,116,97,114,
105,0,53,115,101,114,0,-5.212,128
560 DATA 166,178,181,169,180,179.128,-
5,212,0,36,97,118,101.0,55,104,105,116
,101,-40,82,-40,0,55,105,110,110,105
570 DATA 110,103,0,35,111,109,98,105,1
10,97,116,105,111,110,115,26,13,-72,0,
50,101,101,108,115,0,17,6,18,0,0,33
580 DATA 108,108,0,19,0,50,101,101,108
,115,-18,0,-9,82.0.0,-11,82,-44,0,35,4
0,37,50,50,41,37,51,26,-8,0,18,16
590 DATA 112,-9,0,20,16,112,-8,0,51,52
,50,33,55,34,37,50,50,41,37,51,26,-4,0
,18,16,112,-9,0,20,16,112,-8,0,33,48
600 DATA 48,44,37,51,26,-10,0,18,16,11
2,-9,0,20,16,112,-8,0,34,37,44,44,51.2
6,-11,0,18,16,112,-9,0,22,16,112,-8
610 DATA 0,34,33,46,33,46,33,51,26,-9,
0,18,16,112.-9,0,22,16,112,-8,0.48,37,
33,50,51.26,-11,0,19,16,112,-9.0,24
620 DATA 16,112,-8,0,34,33,50.51,26,-1
2.0,19,16,112,-8,0,17,16,16,112,-8.0,4
8.44.53,45,51,26,-11,0,19,16.112,-8
630 DATA 0,17.16,16,112,-8,0,48,47.53,
46,36,0,51,41,39,46,51,26,-5,0,20.16.1
12,-6,0,24,16,112,0,13,0,45,105.120
640 DATA 101,100,-28,0,17,21.16,112,0,
13,0,45,97,117,118,101,-28,0,18,16,16,
112,0,13,0,39,114,101,101,110,-43.0
650 DATA 17,16,112.0,51,121.109,98,111
,108,0,111,110,0,99,101,110,116,114.10
1,0,108,105,110,101,26,13,-10,0.17
660 DATA 16,112,23,7,115,0,111,110,0.1
14,101,101,108,115,0,17,6,18,0,105,110
,0,97,110,121,0,112,111,115,105,116
670 DATA 105,111,110,26,13,-3,0.18,16,
112,19,0,23,7,115,0,105,110,0,97,110,1
21,0,112,111,115,105,116.105,111,110
680 DATA 26,13,-14,0,20,16,112,-40,0,1
,4,3,-3,2,6,1,3,1,8,3,1,5,2,4,2,6,1,8,
4,3,5,2,1,4,9,1,3,1.3,4,5,2.7.6,6,4
690 DATA 3,1,8.1,2,5,2,6,-3,1,7,3,2.4,
2,5,4,7,3,1,3,2,5,2,1,1,5,3,1,2,3,1,2.
4,1,2,3,5.2,5,6,1,4,1,7,3,8,2,8.6,1
700 DATA 9,1,7,2,3,1,4,4,9,2,1,8,4,8,2
,3,1,4,3,5,2,5,6,2,6.3,4,6,4,1,5,1,3,2
,1,2,7.1,1,2,1,2,2,5,4,5,7,6,3,-3,1
710 DATA 5.2,4,2,6,3,3,7,3,4,8,8,1,5,2
,3,2,1,4,8,9.5,7,9,1,3.9,2,1,7,5.4,8,8
,6,8,1,9,3,1,4.2.1,3,2,6,2,6,4,1,8.5
720 DATA 6,7,9,9,4,3,4,2,3,9,5,6,1,2,7
,2,2,8,9,8,7,4,6,3,4,1,5,-3,1,8,9.6,3,
7,1,2,8,4,1,5,7,3,8,9,5.8,2,4,2.6,8
730 DATA 7,9,5,4,2.3,9,3,6,8,9,7,9,8.8
,9.8.9,6,5,6,7,8,4,9,6,9,3.5,8.8,9,3,3
,7,8,9,2,5,4,8.9,4,6,7.7,6,9,4,-3,8
740 DATA 5,7,9,7,9,6,7,5.8,9,8,8,7,5,6
,9,8,8,9,8,9,6,-20,77,0,174,157,174,18
1,164,167,165,179,0,176,175,183,157
750 DATA 162,175,174,181,179,0,64,95,9
5,96,65,95,95,96,66,95,95,96,67,95,95,
96,68,95,95,96,69,95,95,96,70,95,95
760 DATA 96,71,95,95,96,72,95,95,96,73
,74,95,96,105,106,106,107,105,106,106,
107,105,106,106,107,97,98,99,100,105
770 DATA 106,106,107,105,106,106,107,9
7,98,99,100,105,106,106,107,105,106,10
6,107,105,106,106,107,75,76,95,96,77
780 DATA 78,95,96,79.80,95,96,81,82,95
,96,83,84,95,96,85,86,95,96,87,88,95,9
6,89,90,95,96,91,92,95,96,93,94,95
790 DATA 96,97,98,99,100,105,106,106,1
07,105,106,106,107,105,106.106,107,97,
98,99,100,105,106,106,107,105,106
800 DATA 106,107,97,98,99,100,105,106,
106,107,101,102,103,104,-20,0,-20,77,1
28,176,178,175,166,169,180,128,0,179
810 DATA 180,161,178,180,0,115,112,105
,110,115,0,116,104,101,0,114,101,101,1
08,115,1,0,128,128,162,161.174,171
820 DATA 128,128,-4,0,16,14,16,16,0,0,
179,165,172,165,163,180,0,115,104,111.
119,115.0,112,97,121,111,117,116
830 DATA 115,-6.0.16,14,19,16,1,4,8,12
,6.5,2,9,9,3,1,6,7,12,10,4,2,12,9,5,6,
10,9,6,7,12,5,2,9,1,11,6,3,12,4.10.6
840 DATA 1,9,8,12,4,9,3,12,2,5,6,6,1,1
2,8,5,9,4,9,7,6,10,6,4,12,1,4,1,0,5,2,
0,6,0,1,0,7,0,2,8,3,1,2,9,2,3,1,128
850 DATA 136,16,24,32,40,48,176,56,192
,200,80,194,0,112,68,24,93,-3,4,-4,5,-
3,4,132,32,6,0.70,0,117,6,4,4,16.4,4
860 DATA 6,134,2,2,65,160,118,66,0,112
.2,112,2,2,48,-3.2,48,-12,2,112,-5,2,6
5,196,118,2,2,65,196,118,56,95,77,95
870 DATA 98,95,119,95,148,118,34,93,0,
100,111,117,98,108,101,77,111,114,77.1
10,111,116,104,105,110,103,65,-4.0
880 DATA 110,111,77,108,111,115,101,0,
103,97,109,98,108,101,-3,0,227,111,108
,108,101,99,116,0,0,208,206,210,208
890 DATA 0,103,97,109,98,108,101,-7,0,
115,93,115,116,111,112,-7,0,80,78,81,8
0,80,78,83,80,0,4,1,3,0,6,2,4,0,8,2
900 DATA 6,0,10,3,7,0,12,3,9,0,14,4,10
,0,16,4,12,0,18,5,13,0,20,5,15,-6,0.11
9,105,110,0,208,206,209,208,-6,0,168
910 DATA 175,172,164,0,223,224,251,252
```

```
,253,254,255,0,0,227,161,174,163,165,1
72,168,175,172,164,0,95,96,123,124
920 DATA 125,126,127,0.0,163,161,174,1
63,165,172,112,117,115,104,0,175,176,1
80,169,175,174,0,102,111,114,0,98,97
930 DATA 110,107,-4,0,16,14,16,16,117,
115,101,0,175,176,180,169,175,174,0,10
7,101,121,0,116,111,0,115,101,116,0
940 DATA 115,116,97,114,116,105,110,10
3,0,98,97,110,107,-4,78,0,110,117,109,
98,101,114,0,111,110,0,108,97,115
950 DATA 116,0.114,101,101,108,0,115,1
16,101,112,115,0,116,104,114,111,117,1
03,104,0,230,229,225,244,245,242,229
960 DATA -4,78,0,174,0,111,110,0,102,1
01,97,116,117,114,101,0,103,105,118,10
1,115,0,238,245,228,231,229,243,0,0
970 DATA 176,175,183,0,103,105.118,101
,115,0,115,112,101,99,105,97,108,0,97,
119,97,114,100,-4,78,0,114,97,110
980 DATA 100,111,109,0,168,175,172,164
,0,97,102,116,101,114,0,119,105,110,-4
,78,0,81,80,112,0,97,0,103,111,-4
990 DATA 78,0,231,239,239,228,0,236,24
5,227,235,-4,193,-7,0,117,115,101,0,17
5,176,180,169,175,174,0,107,101,121
1000 DATA 0,116,111.0,115,101,-8,0,112
,111,119,-9,0,112,111,119,-3,0,247,233
,238,0,208,206,208,208,-3,0,112,111
1010 DATA 119,-5,0,114.101,115.116,111
,114,101,-8,0,240,239.247,0,0,115,117,
112,101,114,0,97,117,116,111,0.104
1020 DATA 111,108,100,90,91,92,79,0,15
9,160,187,188,189,190,191,0,0.84,0,90,
91,92,94,123,115,104,105,102,116,125
1030 DATA 0,0,116,111,0,110,117,100,10
3,101.0,117,112,0,112,114,101,115,115,
0,110,0,102,111,114,0,110,117,100
1040 DATA 103,101,115,-15,0,84,0,90,91
,92,94,-4,0,230,229,225,244,245,242,22
9,0,232,229,236,228,-4,0,2,3.2,2,3,2
1050 DATA 4,4,2,3,0,2,6,10,4,6,8,4,20,
15,4,10,0,4,216,169,0,141,39,95,173,31
,208,201,5,240,36,169,70,141,195,2
1060 DATA 169,10,141,197,2.141,200,2,1
69,0,141,198,2,169,17,141,111,2,169,16
0,141.48,2,169,118,141,49,2,76,196
1070 DATA 121,169,0.141,195,2,169,16,1
41,197,2,141,200,2,169,26,141,198,2,16
9.4,141,111,2.169,196,141,48,2,169
1080 DATA 118,141,49,2,162,0,181,176,7
2,232,224,7,208,248,169,0,133,182,56,1
73,242,118,233,1,133,176,173,243,118
1090 DATA 233,0,133,177,164,182,185,24
,95,201,0,240,110,169,0,153,24,95,152,
10,170,189,234,118,133,178,189,235
1100 DATA 118,133,179,166,182,24,189,2
0,95,109,244,118,133,180,173,245,118,1
05,0,133,181,224,3,240,91,162,0,138
1110 DATA 168,177,178,168,177,176,160,
40,145,180,24,105,1,200,192,44,208,246
,160,80,145,180,24,105,1,200,192,84
1120 DATA 208,246,169,0,168,145.180,20
0,192,4,208,249.160,120,145,180,200,19
2,124,208,249,24,165,180.105,120,133
1130 DATA 180,165,181,105,0,133,181,23
2,224,3,208,188,230,182,165,182,201,4,
208,129,162,6,104,149,176,202,224
1140 DATA 255,208,248,76,98,228,162,0,
138,168,177,178,10,10,24,105,88,160,40
,145,180,24,105,1,200,192.42,208,246
1150 DATA 160,80,145,180,24,105.1,200,
192,82,208,246,169,0.168,145,180,200.1
92,2,208,249,160,120,145,180,200,192
1160 DATA 122,208,249,24,165,180,105,1
20,133,180,165,181,105,0,133,181,232,2
24,3,208,186,240,161,72,138,72,152
1170 DATA 72,238,39,95,173,39,95,201,1
,208,20,169,56,141,10,212,141,23,208,1
69,200,141,24,208,169,104,141,9,212
1180 DATA 208,57,201,2,208,30,169,108,
141,10,212,141,22,208,169,0,141,23,208
,169,248,141,24,208,169,255,141,25
1190 DATA 208,169,108,141,9,212,208,23
,169,0,141,10,212,141,23,208,169,138,1
41,24,208,169,224,141,9,212,169,255
1200 DATA 141,21,208,104,168,104,170,1
04,64,173,78,95,201,11,208,6,169,1,141
,40,95,96,205,57,95,208,47,205,99,95
1210 DATA 208,7,170,189,101,121,76,34,
123,201,3,240,31,201,7,240,11,201,8,24
0,7,170,189,89,121,76,34,123,173,99
1220 DATA 95,201,7,240,4,201,8,208,238
```

```
,169,8,76,34,123,162,2,189,56,95,201,3
,240,6,202,16,246,76,140,123,162,2
1230 DATA 189,77,95,201,3,240,6,202.16
,246,76,140,123,162,2,189,98,95,201,3,
208,3,76,48,123,202,16,243,169,3,76
1240 DATA 67,123,173,57,95,201,7,240,9
,201,8,240,5,169,0,76,34,123,173,78,95
,201,7,240,4,201,8,208,240,173,99,95
1250 DATA 201,7,240,4,201,8,208,229,76
,85,123,138,72,152,72,32,225,124,169,8
0,141,20,95,169,85.141,21,95,169,90
1260 DATA 141,22,95,169,97,141,23,95,3
2,232,124,162,0,138,74,168,185,16,95,2
40,47,189,234,118,133,176,189,235
1270 DATA 118,133,177,160,20,177,176,7
2,136,177,176,200,145,176,136,192,0,20
8,245,104,145,176,138,74,168,185,35
1280 DATA 95,56,233,1,201,0,208,2,169,
21,153,35,95,232,232,224,8,208,195,32,
225,124,169,0,141,20,95,169,5,141,21
1290 DATA 95,169,10,141.22,95,169,17,1
41,23,95,32,232,124,32,225,124,169,40,
141,20,95,169,45,141,21,95,169,50
1300 DATA 141,22,95,169,57,141,23,95,3
2,232,124,104,168,104,170,96,138.72,15
2,72,32,225,124,169,0.141,20,95,169
1310 DATA 5.141,21,95,169,10,141,22,95
,169,17,141,23,95,32,232,124,162,0,138
,74,168,185,16,95,240,47,189,234.118
1320 DATA 133,176,189,235,118,133,177,
160,0,177,176,72,200,177,176,136,145,1
76,200.192,20,208,245,104,145,176
1330 DATA 138,74,168,185,35,95,24,105,
1,201,22,208,2,169,1,153,35,95.232,232
,224,8,208,195,32,225,124.169,80,141
1340 DATA 20,95,169,85,141,21,95,169,9
0,141,22,95,169,97,141,23,95,32,232,12
4,32,225,124,169,40,141,20,95,169,45
1350 DATA 141,21,95,169.50,141,22,95,1
69,57,141,23,95,32,232,124,104,168,104
,170,96,165,20,197,20,240,252,96,138
1360 DATA 72,162,0.189,16,95,157,24,95
,232,224,4,208,245,104,170,96,169,0,14
1,47,2,169,248,141,196,2,169,10,141
1370 DATA 197,2,169,0,141,198,2,169,70
,141,199,2,169,224,141,244,2,169.160.1
41,48.2,169,118,141,49.2,169,100,141
1380 DATA 7,212,169,17,141,111,2,162.0
,160,80,152,157,0,208,24,105,32.168,16
9.0,157,192,2,169,255.157,8,208,232
1390 DATA 224,3,208,233,169,48,141,3.2
08,169,176,141,4,208.169,184,141.5,208
,169,192,141.6,208,169,200.141,7,208
1400 DATA 169,255,141,11,208,141,12,20
8,169,70,141,195,2,169,40,141,20.95,16
9,45,141,21,95,169,50,141,22,95,169
1410 DATA 57,141,23,95,162,0,138,72,32
,210,125,72,32,220,125.104,24,105,2,20
1,22,144.3,56,233,21,168,104,170.152
1420 DATA 157,35,95.232,224,4,208,224,
169.1,162,0,157,24.95,232,224.4,208,24
8,162,121,160,114,169,7,32,92,228
1430 DATA 169,183,141,0,2,169,122,141,
1,2,169,192.141,14,212,169,3,141,29.20
8,169,46,141,47.2,96,173.10,210,41
1440 DATA 31,201.20,176,247.96,133.178
,138,10,170,189,234,118,133,176,232,18
9,234,118,133,177,165,178,208,1,96
1450 DATA 160,0,177,176,133,179,200,17
7,176,136,145,176,200,192,20,208,245,1
65,179,145,176,198,178,76,236,125
1460 DATA 169,85,141,34,95,169,0,141,5
1,95,133,180,141,32,95,141,33,95,169,2
02,133,176,169,119,133,177,162,0,134
1470 DATA 77,32,165,126,230,176,208,2,
230,177,169,5,45,31,208,201,5,240,3,76
,121,126,138,72,238,51,95,173,51,95
1480 DATA 201,3,208,33,169,0,141,51,95
,170,165,180,240,3,32,184,126,230,180,
165,180,201,21,208,4,169,1,133,180
1490 DATA 165,180,32,184,126,76,112,12
6,169,128,32,42,127,104,170,232,224,20
1,208,178,240,164,201,4,240,9,169
1500 DATA 126,72,169,61,72,76,66,127,1
65,180,240,5,162,0,32,184,126,32,147,1
26,96,72,152,72,169,0,168,153,200
1510 DATA 117,200,192,20,208,248,104,1
68,104,96,72,152,72,160,0,177,176,153,
200,117,200,192,20,208,246,104,168
1520 DATA 104,96,141,52,95,152,72,160.
0,185,181,0,72,200,192,4,208,247,173,5
2,95,201,11,144,3,24,105,10,24,105,9
1530 DATA 10,10,72,224,0,240,8,141,2,2
10,169,198,141,3,210,104,24,105,0,133,
181,169,117,105,0,133,182,24,165,181
1540 DATA 105,40,133,183,165,182,105,0
,133,184,160,0,177,181,73,128,145,181,
177,183,73,128,145,183,200,192,4,208
1550 DATA 239,173,34,95,32,42,127,169,
0,141,2,210,141,3,210,160,3,104,153,18
1,0,136,16,249,104,168,96,141,53,95
```



```
1560 DATA 138,72,173,53,95,208,3,104,1
70,96,162,0,202,208,253,206,53,95,76.4
7,127,138,72,169,15,141,2,210,169
1570 DATA 168,141,3,210,238,32,95,208,
3,238,33,95,162,6,189,56,118,24,105,1,
201,1,208,2,169,17,201,26,208,2,169
1580 DATA 16,157,56,118,201,16,208,9,2
02,224,5,208,226,162,4,208,222,169,37,
32,42,127,169,0,141,2,210,141,3,210
1590 DATA 104,170,96,162,6,189,24,118,
24,105,1,201,1,208,2,169,17,201,26,208
,2,169,16,157,24,118,201,16,208,9
1600 DATA 202,224,5,208,226,162,4,208,
222,96,162,6,189,24,118,56,233,1,201,1
5,208,2,169,25,157,24,118,201,25,208
1610 DATA 10,202,224,5,208,1,202,224,0
,208,227,173,28,118,208,5,169,16,141,2
8,118,96,138,72,238,30,95,208,3,238
1620 DATA 31,95,169,30,141,2,210,169,1
68,141,3,210,173,31,95,208,16,173,30,9
5,208,13,169,0,141,24,118,32,175,127
1630 DATA 76,7,128,48,248,32,138,127,1
69,37,32,42,127,169,0,141,2,210,141,3,
210,104,170,96,138,72,169,180,141,2
1640 DATA 210,169,168,141,3,210,56,173
,30,95,233,1,141,30,95,173,31,95,233,0
,141,31,95,48,6,32,175,127,76,7,128
1650 DATA 201,255,208,12,173,30,95,201
,255,208,5,169,13,141,24,118,32,138,12
7,76,7,128,138,72,169,200,141,2,210
1660 DATA 169,168,141,3,210,56,173,32,
95,233,1,141,32,95,173,33,95,233,0.141
,33,95,162,6,189,56,118,56,233,1,201
1670 DATA 15,208,2,169,25,157,56,118,2
01,25,208,10,202,224,5,208,1,202,224,2
55,208,227,173,60,118,208,5,169,16
1680 DATA 141,60,118.169,37,32,42,127,
169,0,141,2,210,141,3,210,104,170,96,1
38,72,152,72,32,23,128,32,82,128,162
1690 DATA 0,138,24,105,128,157,0,210,1
69,130,157,1,210,232,232,224,8,208,238
,162,3,169,1,157,16,95,202,16,250
1700 DATA 169,0,141,42,95,162,2,138,10
,168,173,42,95,221,12,95,208,23,169,0,
157,16,95,169,143,153,1,210,169,10
1710 DATA 32,42,127,169,0,153,1,210,15
3,0,210,202,16,219,32,181,123,238,42,9
5,173,42,95,205,15,95,240,3,76,213
1720 DATA 128,169,0,170,157,0,210,232,
224,8,208,248,104,168,104,170,96,133,1
76,138,72,162,0,165,176,56,233,10,48
1730 DATA 3,232,208,248,134,177,24,105
,10,133,176,104,170,96,32,159,129,32,1
1,126,32,207,129,173,32,95,208,55
1740 DATA 173,33,95,208,50,240,0,32,14
7,126,169,0,141,50,95,169,174,133,176,
169,119,133,177,32,165,126,169,0,133
1750 DATA 20,133,19,173,31,208,41,5,20
1,5,208,23,173,50,95,208,242,165,19,20
1,12,208,236,76,55,129,32,147,126,32
1760 DATA 183,129,108,28,95,201,4,208,
3,76,61,129,173,50,95,208,3,238,50,95,
32,66,127,169,128,32,42,127,76,101
1770 DATA 129,138,72,162,7,189,194,119
,157,56,118,202,16,247,169,0,141,32.95
,141,33,95,104,170,96,138,72,162,7
1780 DATA 189,194,119,157,24,118,202,1
6,247,169,0,141,30,95,141,31,95,104,17
0,96,138,72,162,159,189,40,117,41
1790 DATA 127,157,40,117,202,224,255,2
08,243,104,170,96,173,40,95,32,29,129,
165,176,9,208,141,126,119,165,177,9
1800 DATA 208,141,124,119,169,114,133,
176,169,119,133,177,32,165,126,169,255
,133,176,32,1,132,173,40,95,201,1
1810 DATA 240,4,201,11,144,3,76,189,13
1,173,10,210,41,1,141,43,95,240,2,169,
20,24,105,246,133,176,169,0,105,118
1820 DATA 133,177,32,165,126,162,4,189
,123,119,157,38,119,202,208,247,169,30
,133,176,169,119,133,177,32,220,131
1830 DATA 169,164,141.1,210,169,112,13
3,176,173,10,210,41,1,240,22,169,255,6
9,176,133,176,173,248,94,73,128,141
1840 DATA 248,94,173,6,95,73,128,141,6
,95,169,255,141,252,2,166,20,173,252,2
,201,255,208,35,138,56,229,20,201
1850 DATA 244,208,241,165,176,73,255,1
33,176,141,0,210,173,248,94,73,128,141
,248,94,173,6,95,73,128,141,6,95,208
1860 DATA 207,41,63,201,18,208,25,169,
0,141,0,210,141,1,210,32,239,131,169,1
14,133,176,169,119,133,177,32,165
1870 DATA 126,76,189,131,201,61,208,17
2,169,0,141,0,210,141,1,210,32,239,131
,173,40,95,10,13,43,95,10,170,189,70
1880 DATA 119,141,44,95,32,29,129,165,
176,9,80,141,72,119,165,177,9,80,141,7
0,119,189,71,119,141,45.95,32,29,129
1890 DATA 165,176,9,80,141,76,119,165,
177,9,80,141,74,119,169,50,133,176,169
```

ATARI USER MAIL ORDER OFFERS ATARI USER MAIL ORDER OFFERS



This could be your last chance to build up a library of fun and knowledge from our back issues!

SEVEN complete issues: May-November 1985
CONTENTS INCLUDE – A profile of Atari's boss Jack Tramiel; an introduction to the 6502 microprocessor; Basic for beginners; 12 page feature on communicating with your Atari; display list tutorial. Plus lots of games – Action Squash, Frog Jump, Bomb Run, Fruiti Gambler, Maze Munch, Pontoon, Guy Fawkes.
ALSO – Getting to grips with sound and graphics; assembler and disassembler; 68000 addressing modes and operating environment; list processing with Logo; 130XE Ram-Disc utility; Adventure hints and tips; Hex/Ascii dump utility and – much much more.

Only £4.90*

Need a binder for your magazines? We'll send one for £3.95

Inc Postage & Packing UK only

To order turn to the Form on Page 53

```
,119,133,177,32,220,131,169,164,141
1900 DATA 1,210,169,160,133.176,169,25
5,141,252,2,166,20,173,10,210,41,7,73,
248,133,178,173,252,2,201,255,240,6
1910 DATA 41,63,201,62,240,57,138,56,2
29,20,197,178,208,235,165,176,73,255,1
33,176,141,0,210,201,160,208,18,162
1920 DATA 4,169,0,157.247,94,189,73,11
9,157,7,95,202,208,242,240,188,162,4,1
69,0,157,7.95,189,69,119,157,247,94
1930 DATA 202,208,242,240,170.165,176,
201,160,240,13,173,44,95,141,40,95,169
,0,133,178,76,138,131.173,45,95,141
1940 DATA 40,95,169,255,133,178,169.0,
141,1,210,141,0,210,173,40,95,32,29,12
9,165,176,9,208,141,126,119,165,177
1950 DATA 9,208,141,124,119.169,114,13
3,176,169,119,133,177,32,165,126.165,1
78,133,176,32.1,132,173,40,95,240,17
1960 DATA 174,40,95,32,66,127,32,217,1
27,169,160,32,42,127,202,208,242.169,2
55,32,42,127,169,255,32,42,127,32
1970 DATA 239,131,96,72,152,72,160,0,1
77,176,153,248,94,200,192,20,208,246,1
04,168,104,96,72,152,72,160.0,152
1980 DATA 153,248,94,200,192,20,208,24
8,104,168,104,96,138,72,162,255,169,16
6,141,1,210,138,72,69,176,73,255,141
1990 DATA 0,210,104,73,255,-5,74,32,42
,127,202,224,255,208,231,169.0,141,0,2
10,141,1,210,104,170,96,173,46,95
2000 DATA 240,5,169,0,76,64,132,173,10
,210,41,15,24,105,13,133,176,141,12.95
,173,47,95,240,5,169,0,76,87,132,173
2010 DATA 10,210,41,15,24,105,12.133.1
77,141,13,95,173,48,95,240,5,169,0,76,
110,132,173,10,210,41,15,24,105,11
2020 DATA 133,178,141,14,95,173,10,210
,41,15,105,10,133,179,141,15,95,173,13
,95,240,6,24,101,176,141,13,95.173
2030 DATA 14,95,240,8,24,101,176.101.1
77,141,14,95,173,15,95,24,101,176,101.
177,101,178,141.15,95,96.162,0,138
2040 DATA 157,46,95,232,224,3,208,248,
173,49,95,208,7,173,10,210,201,37,144,
3,76,220,133,32,225,124,162,0,138
2050 DATA 157,46.95,232,224,3,208.248,
162,20,189,153,119.157,159.95,189,133,
119,157.139,95,202,208,241,169,140
2060 DATA 133,178,169,255,141,252,2,16
6,20,173,252,2,201,255,208,64,173,31,2
08,201,6,208,3,76,179,133,138,56,229
2070 DATA 20,201,244,208,231,169.196,1
41,1,210,165,178,73,255,133,178,141,0.
210,201,140,208,14,169,140,133,176
2080 DATA 169,95.133,177.32,220,131,76
,226,132,169,160,133,176,169,95.133,17
7,32,220,131,76,226,132,41,63,201,31
2090 DATA 208,21,169,72,141,145,95,141
,165,95,169,73,141,146,95,141,166,95,1
60,0,76,156,133,201,30,208,29,169,74
2100 DATA 141,147,95.141,167,95,169,75
141.148,95,141,168,95,169,76,141.149,
95,141,169,95,160,1,76,156,133,201
2110 DATA 26,208,21,169,72,141,150.95,
141,170,95,169.73,141,151,95,141,171,9
5,160,2,76,156,133,201,18,240.3,76
2120 DATA 226,132,169,160,141,0,210.16
9,168,141,1.210,32,225,124,76,191,132,
169,1,153,46,95,24,152.105,16,141.0
2130 DATA 210,169,168,141,1,210.32,225
,124,76,226,132,169,0.141,0,210,141,1,
210,162,20,189,139,95,201,72,144,4
2140 DATA 201,77,144,5,169,0.157.139,9
5,202,208,237,169.140,133,176,169,95,1
33,177,32,220,131,96,173,31,208.201
2150 DATA 6,208,249,96,169,166,133,176
,169,120,133,177,32,165,126,169,226,13
3,176,169,120,133,177,32,220,131,169
2160 DATA 196,141,1,210,169,16,141,0,2
10,133,176,169,255,32,42,127,169,192.1
41,34,95,162,1,160,19,152,32,184,126
2170 DATA 230,176,165,176,141,0,210,13
6,208,242,162,255,138,-4,74,73,192,141
,1,210,138,141,0,210,173,10,210,201
2180 DATA 159,176,249,168,185,40,117,4
1,127,153,40,117,169,16,32,42,127,202,
208,218,32,207,129,169,0,133,183,169
2190 DATA 186,133,176,169,120,133,177,
32,165,126,162,1,32,239,131,169,72,141
,253,94,169,73,141,254,94,32,178,134
2200 DATA 162,2,32,239,131,169,74,141,
```

```
255,94,169,75,141,0,95,169,76,141,1,95
,32,178,134,162,3,32,239,131,169,72
2210 DATA 141,2,95,169,73,141,3,95,32,
178,134,169,200,133,176,169,117,133,17
7,32,220,131,165,183,141,40,95,32
2220 DATA 227,129,96,138,72,152,72,76,
178,128,202,134,181,138,10,10,24,101,1
81,10,10,24,101,181,170,189,57,95
2230 DATA 133,182,169,56,133,178,169,9
5,133,179,162,0,160,2,177,178,197,182,
240,7,200,192,21,208,245,160,1,132
2240 DATA 180,56,169,43,229,180,157,12
,95,24,165,178,105,21,133,178,165,179,
105,0,133,179,232,224,3,208,213,166
2250 DATA 181,169,0,157,12,95,169,42,1
41,15,95,169,32,141,0,210,169,168,141,
1,210,169,255,32,42,127,169,128,141
2260 DATA 0,210,169,255,32,42,127,169,
32,141,0,210,169,255,32,42,127,169,255
,32,42,127,32,171,134,32,25,123,174
2270 DATA 40,95,169,64,32,42,127,230,1
83,165,183,32,29,129,165,176,9,208,141
,212,117,165,177,9,208,141,210,117
2280 DATA 169,32,141,0,210,169,200,141
,1,210,169,128,32,42,127,169,0,141,0,2
10,141,1,210,202,208,204,169,255,32
2290 DATA 42,127,169,255,32,42,127,169
,206,133,176,169,120,133,177,32,220,13
1,169,255,32,42,127,169,255,32,42
2300 DATA 127,162,2,189,12,95,240,9,56
,169,63,253,12,95,157,12,95,202,16,239
,169,42,141,15,95,32,171,134,96,169
2310 DATA 3,141,15,210,32,207,129,32,1
47,126,32,239,131,32,159,129,169,203,1
41,28,95,169,135,141,29,95,32,220
2320 DATA 138,32,250,124,76,55,129,162
,0,138,157,46,95,232,224,3,208,248,141
,54,95,141,49,95,169,0,133,77,173,10
2330 DATA 210,201,171,144,19,173,54,95
,240,14,169,70,133,176,169,121,133,177
,32,165,126,76,5,136,32,147,126,169
2340 DATA 0,141,54,95,32,207,129,32,46
,132,32,168,128,32,239,131,32,25,123,1
73,40,95,208,60,173,120,95,24,109,54
2350 DATA 95,201,21,144,2,169,20,133,1
82,173,120,95,240,37,172,54,95,192,0,2
40,11,152,162,1,142,34,95,162,0,32
2360 DATA 184,126,200,152,162,128,142,
34,95,162,1,32,184,126,196,182,208,229
,140,54,95,76,93,136,169,0,141,54,95
2370 DATA 32,207,129,32,227,129,32,173
,137,173,55,95,240,6,32,153,136,76,128
,136,173,33,95,208,8,173,32,95,208,3
2380 DATA 76,147,136,32,165,132,169,0,
141,49,95,173,33,95,208,8,173,32,95,20
8,3,76,147,136,32,147,126,76,220,135
2390 DATA 32,207,129,76,76,129,162,19,
189,50,121,157,246,120,202,224,13,208,
245,169,246,133,176,169,120,133,177
2400 DATA 32,220,131,169,10,133,176,16
9,121,133,177,32,165,126,169,76,133,17
8,169,255,141,252,2,166,20,173,252,2
2410 DATA 201,255,208,43,173.31,208,20
1,6,208,3,76,96.137,138,56,229,20,201,
244,208,231,169,196,141,1,210,165
2420 DATA 178,73,127,133,178,141,0,210
,173,6,95,73,128,141,6,95,76,192,136,1
33,179,41,63,201,31,208,5,162,0,76
2430 DATA 27,137,201,30,208,5,162,1,76
,27,137,201,26,208,5,162,2,76,27,137,7
6,192,136,169,128,141,0,210,169,168
2440 DATA 141,1,210,160,3,169,0,153,16
,95,136,16,250,169,1,157,16,95,165,179
,41,64,208,6,32,181,123,76,67,137,32
2450 DATA 75,124,169,127,45,6,95,141,6
,95,206,6,95,32,25,123,173,40,95,208,3
7,173,6,95,201,80,240,56,76,192,136
2460 DATA 169,0,141,0,210,141,1,210,32
,239,131,173,33,95,208,10,173,32,95,20
8,5,104,104,76,147,136,96,169,255,32
2470 DATA 42,127,169,0,141,0,210,141,1
,210,32,239,131,104,104,169,1,141,49,9
5,76,82,136,169,0,141,0,210,141,1
2480 DATA 210,32,239,131,32,147,126,10
4,104,169,1,141,49,95,76,93,136,160,0,
140,55,95,173,54,95,201,4,208,5,162
2490 DATA 0,76,239,137,201,7,208,5,162
,64,76,239,137,201,11,208,5,162,128,76
,239,137,201,15,208,5,162,192,76,239
2500 DATA 137,201,18,208,7,162,0,160,1
,76,239,137,201,20,208,6,32,228,133,76
,203,138,96,24,138,105,192,133,178
2510 DATA 152,105,115,133,179,160,6,16
2,110,142,34,95,162,132,142,5,210,162,
100,142,4,210,162,1,173,54,95,32,184
2520 DATA 126,169,0,141,5,210,141,4,21
0,173,54,95,32,184,126,136,208,221,173
,54,95,32,184,126,169,255,141,252,2
2530 DATA 160,0,162,0,169,30,133,176,1
69,121,133,177,32,165,126,177,178,133,
182,10,10,24,105.38,105,0,133,180
2540 DATA 169,117,105,0,133,181,161,18
0,9,128,129,180,56,169,38,229,182,10,1
0,141,0,210,169,166,141,1,210,173
2550 DATA 252,2,201,255,208,29,169,32,
32,42,127,161,180,41,127,129,180,169,0
,141,0,210,141,1,210,200,192,64.208
2560 DATA 2,160,0,76,62,138,41,63,201,
35,240,8,169,255,141,252,2,76,109,138,
32,147,126,169,0,141,0,210,141.1,210
2570 DATA 165,182,141,55,95,201,1,240,
8,169,94,141,69,121,76,185,138,169,79,
141,69,121,165,182,9,80,141,64,121
2580 DATA 169,50,133,176,169,121,133,1
77,32,220,131,162,128,32.225,124,202,2
08,250,32,207,129,169,0,141,54,95,96
2590 DATA 162,0,189,64,118,157,56,95,2
32,224,132,208,245,169.0,141,35,95,141
,36,95,141,37,95,141,38,95,96
2600 DATA 224,2,225,2,167,135
```

Get it right!

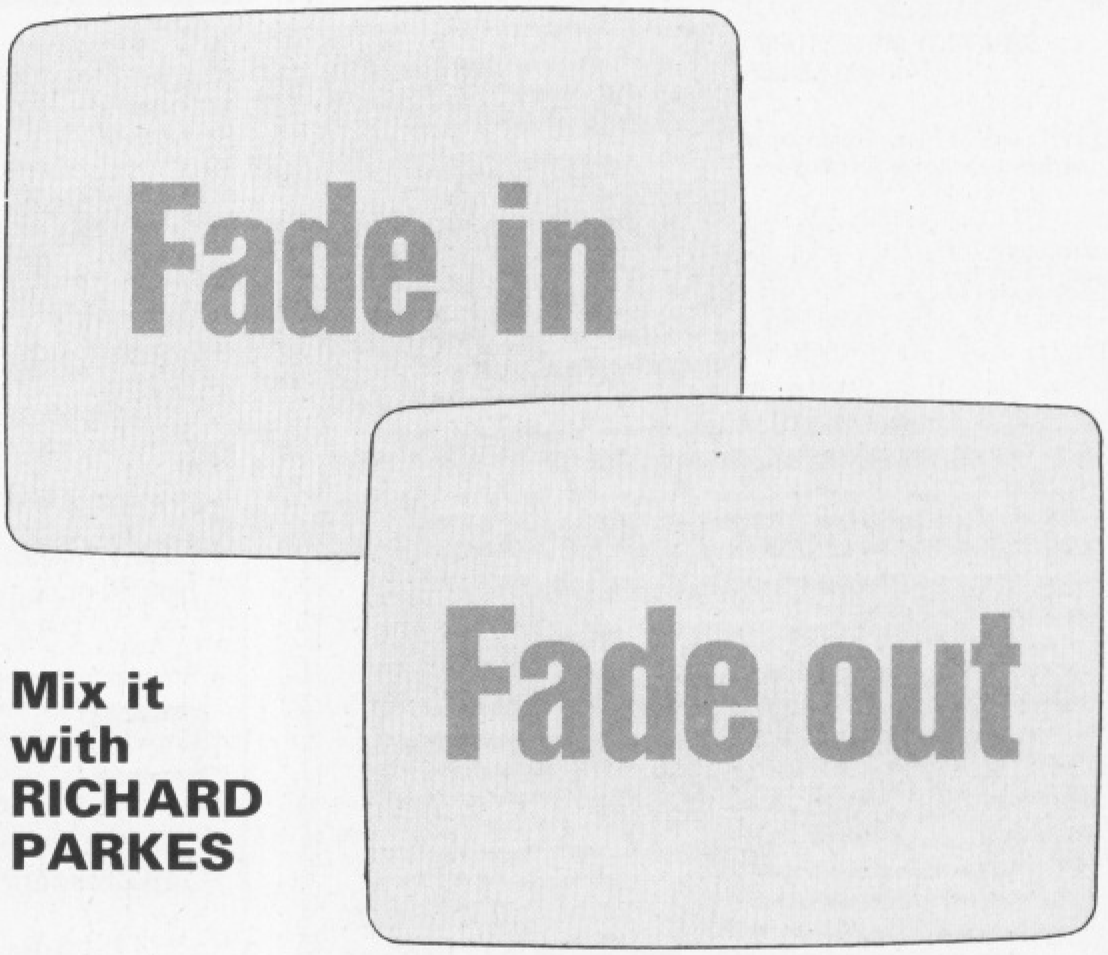
LINE	CHSUM	LINE	CHSUM	LINE	CHSUM
10	2155	20	4901	30	9654
40	8487	50	9951	60	12877
70	4502	80	15976	90	15775
100	16096	110	15970	120	16001
130	15623	140	15865	150	16069
160	16233	170	16163	180	16189
190	15837	200	16132	210	15660
220	16031	230	15728	240	15971
250	15743	260	15607	270	15717
280	15560	290	16197	300	15631
310	15640	320	15667	330	15938
340	15712	350	15975	360	15875
370	15944	380	15893	390	15663
400	15709	410	15906	420	16296
430	16153	440	15797	450	16317
460	15909	470	16227	480	15855
490	15881	500	15733	510	15939
520	15902	530	15928	540	15787
550	15666	560	16172	570	15825
580	15602	590	15944	600	15857
610	15874	620	15830	630	15922
640	15671	650	15686	660	15788
670	15878	680	15629	690	15560
700	15597	710	15934	720	15851
730	16072	740	16266	750	16643
760	16490	770	16334	780	16483
790	15856	800	16286	810	15688
820	15627	830	15967	840	15725
850	16201	860	16147	870	15812
880	15933	890	16005	900	16051
910	15919	920	16191	930	15795
940	15683	950	16082	960	15858
970	15673	980	15603	990	16069
1000	15645	1010	15607	1020	16127
1030	15314	1040	15877	1050	15668
1060	15886	1070	15841	1080	16015
1090	15810	1100	15930	1110	15950
1120	16058	1130	15772	1140	16143
1150	15990	1160	15786	1170	15961
1180	15827	1190	15928	1200	16205
1210	15893	1220	15917	1230	15981
1240	16162	1250	15992	1260	15920
1270	16007	1280	16120	1290	15843
1300	15883	1310	16109	1320	15782
1330	16027	1340	16246	1350	16160
1360	15876	1370	16173	1380	15938
1390	16169	1400	16023	1410	15952
1420	15839	1430	15807	1440	15943
1450	15973	1460	16160	1470	15939
1480	15810	1490	15828	1500	15837
1510	15752	1520	15948	1530	15963
1540	16067	1550	15848	1560	15791
1570	15917	1580	15920	1590	15746
1600	16084	1610	15834	1620	16142
1630	15950	1640	16021	1650	15873
1660	16067	1670	15794	1680	15994
1690	15644	1700	15922	1710	15819
1720	16144	1730	15824	1740	16164
1750	16055	1760	15983	1770	15992
1780	15913	1790	16064	1800	15834
1810	15783	1820	16026	1830	15937
1840	15848	1850	16224	1860	15744
1870	16055	1880	16200	1890	16004
1900	15949	1910	15948	1920	16189
1930	15921	1940	15912	1950	16185
1960	15897	1970	15899	1980	16191
1990	15651	2000	16019	2010	15764
2020	15785	2030	15925	2040	15799
2050	15996	2060	16119	2070	15834
2080	16125	2090	16184	2100	15995
2110	15872	2120	15930	2130	15763
2140	15908	2150	16214	2160	16104
2170	15805	2180	16234	2190	16191
2200	15972	2210	15810	2220	15821
2230	15881	2240	15948	2250	15963
2260	15954	2270	15961	2280	15749
2290	15861	2300	16095	2310	15837
2320	16241	2330	15960	2340	16143
2350	15806	2360	16158	2370	16143
2380	16106	2390	15964	2400	16161
2410	15803	2420	15929	2430	15904
2440	16079	2450	15983	2460	16070
2470	15559	2480	15970	2490	16171
2500	15833	2510	16011	2520	15946
2530	15748	2540	15720	2550	15913
2560	15923	2570	15971	2580	16146
2590	15248	2600	3988		

Listing II

```
5 REM CHANGES FOR CASSETTE OUTPUT
6 REM DELETE LINE 2600 AND ADD:-
30 OPEN #1,8,128,"C:":TRAP 60:CH=0:XCH
=909948
70 DATA 0,76,93,101,127,101,169,60,141
,2,211,169,248,141,231,2,133,14,169,13
8,141,232,2,133,15,169,167,133,10,169
75 DATA 135,133,11,24,96
```

Get it right!

LINE	CHSUM	LINE	CHSUM	LINE	CHSUM
5	16544	6	15763	30	7369
70	16589	75	3344		



Mix it with RICHARD PARKES

WHEN switching between two screens of the same graphics' mode, some commercial programs use an effect where the displays are mixed so that as the first display disappears, the other starts to appear. Using the Mix utility, you can achieve this in your own programs.

Mix adds the MIX$ command to your programs which is called using:

A=USR(ADR(MIX$),SCADDR,BANK)

where **MIX$** is the string containing the machine code data.
SCADDR is the address of the start of the screen memory for the new display which is to be mixed in.
BANK is the bank of memory on the XE where the new screen is stored. The correct values are:

- 0 Normal memory. Use this on 8 bit Ataris other than the XE.
- 1 Memory between 0 to 16383.
- 2 Memory between 16384 and 32767.
- 3 Memory between 32768 and 49151.
- 4 Memory between 49152 and 65535.

Type in Program I up to and including line 310 and then LIST it to disc or cassette. It can then be easily merged with any of your other programs using the ENTER command.

Now finish typing in Program I. The short example section of the program will not run in 16k, because two graphics 8 screens are set up.

If you have any problems typing in MIX$, you can check it using the checksum table and our Get It Right! program which was last published in the August 1986 issue of *Atari User*. Alternatively, you can download this and all other *Atari User* programs from MicroLink. ■

```
195 REM BASIC MIX$ DATA PROGRAM
200 DIM MIX$(277):FOR J=1 TO 277:READ
A:MIX$(J)=CHR$(A):NEXT J
210 DATA 104,160,0,140,255,6,164,10,14
0,234,6,10,201,4,240,13,170,240,4,104,
202,208,252,160,1,140,255,6
220 DATA 96,173,48,2,133,203,173,49,2,
133,204,160,4,177,203,133,212,200,177,
203,133,213,104,141,236,6,104
230 DATA 141,235,6,162,1,104,208,212,1
04,201,5,176,211,170,202,138,42,42,141
,239,6,173,1,211,141,240,6,41
240 DATA 227,13,239,6,141,239,6,169,32
,141,238,6,169,0,141,237,6,173,234,6,1
33,203,133,207,173,233,6,133
250 DATA 204,10,133,208,38,207,24,165,
204,101,208,133,208,133,204,165,207,10
1,203,133,207,133,203,6,208
260 DATA 38,207,165,208,133,205,6,208,
38,207,6,208,38,207,24,165,208,101,204
,133,208,133,204,165,207,101
270 DATA 203,133,207,133,203,165,205,1
33,207,169,41,208,2,208,179,133,208,56
,165,208,229,204,133,208,141
280 DATA 233,6,165,207,229,203,133,207
,141,234,6,41,31,133,207,24,165,208,10
9,235,6,133,203,165,207,109
290 DATA 236,6,133,204,160,0,173,239,6
,141,1,211,177,203,170,173,240,6,141,1
,211,24,165,208,101,212,133
300 DATA 203,165,207,101,213,133,204,1
97,106,176,3,138,145,203,56,173,237,6,
233,1,141,237,6,173,238,6,233
310 DATA 0,141,238,6,13,237,6,208,155,
96
380 REM MIX$ EXAMPLE PROGRAM
390 REM (TO BE TYPED IN AFTER BASIC MI
X$DATA PROGRAM)
400 DEG :DIM S(90),C(90),B(4):FOR J=0
TO 90:S(J)=ABS(SIN(J)):C(J)=ABS(COS(J)
):NEXT J
410 TRAP 32760:RT=PEEK(106):GRAPHICS 3
1:STL=PEEK(88):STH=PEEK(89)
415 POKE 106,PEEK(106)-32:GRAPHICS 31:
POKE 106,RT
416 FOR J=1 TO 4:B(J)=1:NEXT J
420 POKE 88,STL:POKE 89,STH:COLOR 125:
PLOT 0,0
450 GOSUB 1000
460 A=USR(ADR(MIX$),STL+STH*256,0):IF
PEEK(1791)<>0 THEN A=LOG(0)
470 B(4)= NOT (B(4))
480 IF B(4)=1 THEN 600
490 B(3)= NOT (B(3)):IF B(3)=1 THEN 60
0
500 B(2)= NOT (B(2)):IF B(2)=1 THEN 60
0
510 B(1)= NOT (B(1))
600 GOTO 420
1000 COLOR 1:FOR J=0 TO 90
1010 Y1=96-90*(C(J)*B(1)+1)*(S(J)*B(2)
+1)+90*(B(1)+B(2))
1020 Y2=96+90*(C(J)*B(3)+1)*(S(J)*B(4)
+1)-90*(B(3)+B(4))
1030 PLOT (10+J*10/3)/2,Y1:DRAWTO (310
-J*10/3)/2,Y2
1050 NEXT J:RETURN
32760 POKE 106,RT:GRAPHICS 0:? :? "Err
or- ";:IF PEEK(1791)<>0 THEN ? PEEK(17
91);:GOTO 32762
32761 ? PEEK(195);
32762 ? " at line ";PEEK(186)+PEEK(187
)*256:END
```

Program I

Get it right!

LINE	CHSUM	LINE	CHSUM	LINE	CHSUM
195	5456	200	10455	210	14879
220	15072	230	14987	240	15110
250	14976	260	15091	270	15077
280	15076	290	14953	300	15161
310	5645	380	4962	390	10025
400	13921	410	11671	415	8154
416	4822	420	8166	450	1925
460	11180	470	2645	480	3160
490	5921	500	5908	510	2618
600	1620	1000	3910	1010	7470
1020	7509	1030	7579	1050	3166
32760	15905	32761	2051	32762	7228

STRATEGIC PLUS SOFTWARE

SPECIALISTS IN QUALITY COMPUTER GAMES FOR THE DISCERNING GAMER

STRATEGY, ADVENTURE AND SPORTS GAMES FOR THE ATARI 800 SERIES, 130XE AND ATARI ST.

Send for our free 20 page catalogue, which has a large selection of titles, with descriptions and complexity ratings for each game.

ATARI ST

ALTERNATE REALITY	£24.95	PHANTASIA (SSI)	£35.00
DEEP SPACE (Psygnosis)	£32.95	ULTIMA III (Origins)	£49.00
SILENT SERVICE (Microprose)	£24.95	PHANTASIE II	£35.00

FLIGHT SIMULATOR II (Sub Logic) £42.00

Please ring for details of Balance of Power £43.00

ATARI 800 SERIES AND ATARI 130XE

WIZARDS CROWN (SSI) – Fantasy role-playing game, with individual tactical combat and highly detailed character attributes. Great for both the adventure gamer and wargamer alike! £35.00

COMPUTER QUARTERBACK (SSI) – Grid-iron strategy and tactics at it's best. Build your own teams. One or two player options, with 'play by play' printouts in the two player 'Pro' game! great for league play £35.00

COMPUTER QUARTERBACK TEAMS DATA DISCS (SSI) – 1984 and 1985 Seasons £15.00

SSI NEW LOWER PRICES

ANTIETAM	£29.99	U.S.A.A.F.	£29.99
GETTYSBURG/THE TURNING POINT	£29.99		

For further details call us on:
01-979 2987
Or write to: Strategic Plus Software
P.O. Box 8
Hampton
Middlesex TW12 3XA.
Callers are welcome by appointment.
BUSINESS HOURS: 10am-6pm Mon-Fri
11am-4pm Saturdays

ALL PROGRAMS ARE ON DISC ONLY
Prices include postage and packing and VAT
Please specify computer when ordering.
Overseas orders welcome, please add £2.00 extra for each item ordered.

ACCESS VISA

BULK DISKS AT CRAZY PRICES

5.25"	25	50	100	200	250
S/S D/D	£13.99	£25.99	£48.99	£95.99	£115.99
D/D 96TPI	£14.99	£26.99	£49.99	£96.99	£119.99
Coloured	£18.99	£35.99	£69.99	£129.99	£149.99

All disks are supplied with write/protect tabs, labels and envelopes. Coloured disks run on any disk drive either 40 or 80 track, single or double.

3.5"	25	50	100	200	250
D/S 135 TPI	£39.99	£75.99	£139.99	£259.99	£299.99
S/S 135 TPI	£37.99	£72.99	£132.99	£246.99	£259.99

All disks come with a full lifetime guarantee and are made to TOP international standards.
Remember all prices include VAT & Delivery

SPECIAL OFFER BOX

Buy 100 5.25" disks and receive lockable storage box all at special price of £54.99

LOCKABLE STORAGE BOXES

5.25"	Holds	3.5"
£11.95	100	£11.95
£9.95	50	£9.95
£1.95	10*	£1.95

*(not lockable)

ACCESS VISA

CENTEC
0689-61947
18 Crescent Way, Green St. Green, Orpington Kent BR6 9LS
Please call for bulk and educational prices

RICK HANSON
FOR THE ATARI XL/XE WITH DISC DRIVE.

IT'S BRILLIANT. BUY IT.

£14.95

ADVENTUROUS PEOPLE LOVE ROBICO

3 Fairland Close, Llantrisant, Mid Glamorgan. CF7 8QH Tel (0443) 227354
Devon: C&F Associates 02373 619
North Humberside: Fees Distribution 0724 857652
West Yorkshire: R&R Distribution 0977 795544
Kent: S.D.L. 01-309 0300
Midlands: Software Express 021 328 3585

A WINNER ALL THE WAY...

I AM writing to let you and other Atari users know about my experiences recently when I bought a new Atari setup as a result of a nice little win on the pools (nothing dramatic but enough to go to an Atari supplier and say "one of them, two of them, box of them, one of them" and so on). A very nice feeling indeed.

I decided to stick with 8 bits for a variety of reasons, so the order was for a 130XE, two disc drives, 1027 printer, 1020 plotter, a touch tablet and various other bits and bobs.

According to the advertisements in your magazine, this amounted to around £800 worth.

Acting on advice from a colleague who got a decent discount for cash on a BBC printer, I rang round the four Atari suppliers within a reasonable range of Sheffield asking for a quote for the lot paid for with cash.

Two suppliers made feeble offers and one actually jacked up the price by £70 and offered me a discount which brought the price back to the original. I don't know who they were kidding?

However, there was a firm which made me an offer which I could not refuse.

So it came to pass that I got the setup. The day after I collected it I sat down and started to use it. After about two hours one of the disc drives and the 1027 broke down.

Naturally I got in touch with the suppliers at once, with the result that they swopped them straight away, no quibbles. They were friendly people to deal with and even apologised for my inconvenience – I was impressed.

I therefore nominate Compumart of Loughborough for a Pat On The Head award. – **J.E. Colley, Sheffield.**

Technical queries

COULD you help me in trying to interface a non-Atari printer to an 800XL?

The printer has a serial interface, but during my investigations it appears that the computer is sending out some data and expects a reply from the printer. When it doesn't get one it aborts with a timeout error. What am I doing wrong?

Also, could you tell me the prices and a source of supply for the Atari technical manuals and plugs to fit the serial port. I have a fairly good knowledge of computer systems and electronics generally. – **J. Connolly, Redcar.**

● You need to use an RS232 interface to run your printer, the best being the Atari 850 module, though you might find others that work. The Atari serial port is an internal standard running at 19,200 baud with its own protocol and command frame system.

You would need to be an expert machine code programmer to alter this and it would be far easier to use an 850 anyway.

Don't forget that you would also need to check your software is capable of sending to RS232 rather than the P: printer port. SuperScript does this, but not AtariWriter for example.

Your own home grown software could be easily made to use either port, of course.

Manual dexterity

I HAVE recently purchased an 800XL, but have found the manuals to be far from helpful. I was awaiting Allrecht, Finkel and Brown's Atari Basic book from my local library, when I discovered Atari User.

It is a very good magazine, but I am having problems with the Santa's Grotto game in the December 1986 issue. I keep getting an error 3 at line 20110, but line 20110 seems to be correctly typed in. Can you help? – **T.E. Pottle, Gosport.**

● Error 3 simply means that a number the computer has come across is outside the range it expects. In this case it is most likely that the variable CHBASE is the guilty party, being either too large or too small.

After the error has occurred, try typing PRINT CHBASE, which should give a positive number no greater than 65535. In actual fact, it will be within a much smaller range.

Since CHBASE is calculated from another variable, RAMTOP, the problem might lie in line 20050 which sets up RAMTOP in the first place. Don't forget to use Get It Right! to check the lines before you run the program.

Loading errors

I HAVE been unsuccessful in loading Football Manager. I keep getting errors 140 and 143. I would be grateful if you could explain these errors and advise me on the correct way to solve them. – **P.E. Malone, Preston.**

● These are known as checksum errors and occur because data from the tape has been corrupted before it reaches the machine. This may be caused by a bad tape, or a fault in the recorder or the computer.

When a tape is recorded, each block of 128 characters is followed by a special extra digit which is basically a total of all the character numbers preceding it.

When loading the tape back in again, the computer does the same additions on the data bytes as they come in and checks the new value off against the one from the tape.

In much the same way as our Get It Right! checksum, the computer can then tell if the data it has loaded was

→

8 bit interfacing

I WOULD like to congratulate you on your articles on interfacing the 8 bit Atari computers.

I am interested in interfacing such machines and require information on the bus connections on the XL machines. Unfortunately I have been unable to find such data anywhere.

Do you know of any books which contain this information and where could I obtain them? – **Steven Trease, Nottingham.**

● The connections you require are listed in the revised edition of Mapping the Atari, from Compute! Books, but from then on you will need a good technical knowledge of electronics to proceed.

Perhaps Atari will soon see fit to update its excellent Technical User notes to cover the XL and XE.

the same as that originally saved. If any discrepancies occur, the computer will signal an error – normally a 140 or a 143 – and stop the load.

Atari User Mailbag

WE welcome letters from readers – about your experiences using the Atari micros, about tips you would like to pass on to other users . . . and about what you would like to see in future issues.

The address to write to is:

Mailbag Editor
Atari User
Europa House
68 Chester Road
Hazel Grove
Stockport SK7 5NY

Exploring possibilities

FOR the past 12 months my son has had an Atari 800XL. He has only used the machine for games up until now, only occasionally trying other features.

I now think it is time he explored the possibilities of the computer, the graphics and writing simple programs and so on.

If you could pass on any advice on this we would be very grateful. And if you have the name of any book we could buy which defines all the computer jargon this too would be very helpful.

Do you advise us to get a disc drive or stay with cassette type? – **David and Michael Burno, Mossley.**

● For now a tape will suffice, though a disc is much faster and more reliable. If he takes to programming, he will very quickly find that waiting for a tape to load or save is very frustrating indeed.

We often run articles in *Atari User* helping new users to find their way around the machine and you will certainly find many of the features and series in our first few issues of benefit. Why not order some from our back issues department?

Increasing word power

I RECENTLY visited the Christmas Atari User show and whilst there I purchased an Atari 1029 dot matrix printer and a copy of AtariWriter Plus for my 800XL.

I had not used a word processing program before, but I found it really quite easy to use. This letter is my first full length attempt at using the program and I have found it and the manual to be excellent. My only complaint is that there are only two print modes available – normal and double width.

Would it be possible to review some of the other word processing packages for the 8 bit range? – **Mick Smith, Ashford, Kent.**

● We have covered some other word processor packages in previous issues – notably the SuperScript program in the March 1986 issue.

80 column cartridges

I WOULD greatly appreciate it if you could tell me of a way I could have 80 column text with my AtariWriter cartridge word processor. I use my 800XL for translations for the Ministry of Foreign Affairs of Greece.

I own an LX-80 Epson printer, 1050 disc drive and a Hantarex Boxer monitor. Although I also have Letter Perfect I find the cartridge based word processor is extremely easy to use and a perfect partner for my work.

The only problem is that with 40 columns I have to preview my documents and make corrections at the cost of valuable time. – **J.M.D. Mantheakis, Athens, Greece.**

● The answer is simple – you will soon be able to purchase an update of AtariWriter, called AtariWriter 80, which will work with the new XEP-80 80 column module. Until then you're stuck with 40 columns I'm afraid.

Getting It Right!

I HAVE just purchased my first copy of Atari User. I have been looking for such a magazine for over a year and find it very informative.

Please could you tell me how I can operate Get It Right! as it is an obvious boon when typing in programs. At the moment the list of numbers don't mean a thing to me. – **D.E. Boulter, Salcombe, Devon.**

● The instructions for our checksum program Get It Right! can be found in the August 1986 issue of *Atari User* which can be ordered using the form on Page 53.

Software compatibility

FIRST I would like to compliment you on such a great magazine which I have been reading even though I got rid of my 800XL some time ago.

I am now considering a 130XE. Could you please tell me if there are any compatibility problems with games for the 800XL? – **L.P. Arnold, Littlehampton, Sussex.**

● The 130XE is really just an 800XL with an extra 64k of memory available. This means that you should have no problems at all with software compatibility between the XL and the XE, although you will still have the same problems as you had with the XL in running some of the older software written for the 400 and 800 machines.

Keyboard inputting

I OWN an Atari 800XL and wondered if cartridges for the earlier 400 and 800 are compatible with it. Also could you tell me how to get input without the user having to press Return? – **Neil Evans, Avon.**

● You can use most 400/800 cartridges with the XL and XE machines, but some badly written code will not work properly. This applies as much to tape and disc software as it does to cartridge, so its always best to check first. That said, the vast majority of software works fine with the XL.

You can get input from the keyboard without requiring the user to press Return by side-stepping the normal INPUT routines.

Use instead the GET command which gets a single character, and build up from there. Don't forget to OPEN a channel to the keyboard first, with:

OPEN#1,4,0,"K:".

For example, to get five characters from the key-board and place them directly into a string, use:

```
10 OPEN #1,4,0,"K:"
20 DIM TEXT$(5):TEXT$="
" :REM 5 SPACES
30 FOR CHAR=1 TO 5
40 GET #1,BYTE
50 TEXT$(CHAR,CHAR)=
   CHR$(BYTE)
60 NEXT CHAR
```

You could always test BYTE each time in case it was 155 – the code for Return – after which you could drop out of the loop since the user did not want to enter all five characters.

If you wanted the user to enter a number follow the same procedure and take the VAL of the string at the end – for example:

70 NUMBER = VAL(TEXT$)

Silicon Dream & Jewels of Darkness

I BOUGHT Rainbird's Silicon Dreams and Jewels Of Darkness trilogy at the recent Atari User show, but can't get them working.

I have a 48k Atari 400. PEEK(106) returns 160 and I have no trouble running other 48k software.

I can get to the menu and loading message on both discs, but after the load is finished I get a blank screen full of colourful garbage. I have removed the Basic cartridge and all unnecessary peripherals.

In desperation I visited Rainbird and they were most helpful. They managed to run the discs on a 130XE and told me that they had been successfully tested on an expanded 400. Might my expansion board be at fault? – **R.S.L. Gillman, Tiptree, Essex.**

● According to Rainbird's technical department, your problem lies with the fact that the program needs at least 64k to run.

YOUR HINTS AND TIPS

MEDIATOR

PLEASE could anyone tell me how to get past the first screen of English Software's Mediator?

I have tried bombing the city and landing in various places, but I always get killed. I am on the verge of throwing the disc out of the window! – **Brian, Belgium.**

● Help is at hand from Ben Park of London SE27, who has written in to tell us that you have to land your craft on the pad between the two radars at Xylos and Pholos.

BOUNTY BOB

OVERLOAD the cannon in level 22. When the hat comes down, press F then move your man over a platform and press F again. An option screen will appear which will allow you to move to the level of your choice. – **Adam Marshall, Penrith.**

MERCENARY – THE SECOND CITY

IF you realised that the Cheese in Mercenary was a fast spaceship, then you might be wondering what has happened to it in The Second City.

Fear not, it hasn't gone at all, it's simply changed into a table, which can be found in the Palyar briefing room. You can then use the ship to get the neutron fuel, which is above the colony craft. – **Mark Wilson, Anglesey.**

SPELLBOUND

I HAVE been playing Spellbound for days and days and I am absolutely stuck. Can anyone help me get past the tower, the wall and the gas room. – **Andy Roberts, Little Sutton, South Wirral.**

Our thanks to Ben Halligan for this bumper bundle of tips:

MERCENARY

FIND the aerial and take it to the broken communications room in the underground complex near the hangar at 09-06.

You will be offered an intergalactic craft and if you buy it a rendezvous will be arranged. There is a hangar in the wasteland at location 81-35 which may prove helpful.

RESCUE ON FRACTULUS

IF an alien boards your ship, put the boosters on immediately, try to shut the airlock then turn all systems on.

Pull back on your joystick. The ship's instruments will go haywire, but if you have enough power you might make it into space where the alien will die.

DROPZONE

PICK up all the men and deposit them at the base. Keep the last one and go and kill the enemy. If you are killed, collect the man immediately because he prevents you from being killed by the volcanoes.

ZORRO

DO you keep getting lost in the caves? Always take the nearest exit after collecting the bags of money. When you get to the screen with three flashing icons, go through the top left exit and push the barrels in the wine cellar. Then go back, past the icons and up.

Recorder diagnostics

RECENTLY my 1010 data recorder has not been loading my original computer games. I was wondering if a XC12 recorder would be compatible with my 800XL? – **Andrew Bolton, Bristol.**

● The XC12 will run with your 800XL, certainly, but is this your problem? The tapes may not load for a number of reasons, the most likely being simple misalignment of the record/play head.

You may also find that cleaning the tape heads will improve the load reliability. If you take your recorder into your local dealer they will almost certainly be able to arrange for it to be serviced for you.

On the other hand, if you have played the cassettes an awful lot you might have actually worn out the tape itself. This can happen, as the magnetic coating can gradually wear off the backing material after hundreds of passes though the recorder.

Check them out on a known good tape recorder before parting with your hard earned cash for a new unit.

Keeping in touch

IN reading Atari User *I am surprised in that a large number of advertisers do not have Email, MicroLink, Telecom Gold or telex numbers.*

To me, a fairly new user, I feel a software and hardware supplier who does not use or is not linked to this new exciting way to communicate is doing a disservice to the micro computer business.

After all, the more users of the system, the more they will sell. But if they do not use the technology themselves how can they convince people like me to use it?

I would often like to send for literature via Email rather than by phone. The micro shops are also badly set up to market this product.

In Edinburgh I went round all the shops to see a demonstration of MicroLink, Prestel or Telecom Gold, but it was on my third visit to

→

one shop before they had the system up and running. I would be interested to know if others feel as I do. – **Tom Stark, Edinburgh.**

● Tom sent this message via MicroLink. Don't forget that as well as the usual Atari User postal address, we can be contacted on MicroLink and Telecom Gold at 72:MAG001 and on Prestel at 614568383.

And don't forget to mark your Email "For the attention of *Atari User*".

You can even send us your articles by Email, as do most of our regular contributors. The whole editorial team of *Atari User* use MicroLink to send complete features straight from our word processors at home into the office computers – which are linked direct to the typesetting machines.

We write everything on the ST and can thus send our material straight in for typesetting without a single mistake occurring – well, that's the theory, anyway.

Ribbon recycling

OUR apologies to anyone who wishes to contact Aladdink about their printer ribbon reinking service. The address which we gave for them in the January 1987 issue of Atari User was incorrect: It is in fact 4 Hurkur Crescent, Eyemouth, Berkshire TD14 5AP.

Trak-ball or joystick?

I HAVE been a joystick addict for about four years but as a Christmas present I was given a trak-ball which I prefer for most games.

The only problem is I do not know which games will run in trak-ball mode. Could you give me a list of games which will.

Also, could you give me a short routine which would allow me to read the trak-ball from Basic? – **Richard Taylor, Prestwick.**

● The only game which has a specific trak-ball mode – as opposed to those which can use the trak-ball in the joystick emulator mode – is Missile Command. This is a shame, as such games as Centipede would be great in the trak-ball mode.

You can read the trak-ball in the same way as a joystick – by using the STICK and STRIG commands. For the first joystick, STICK(0) will return the direction value, and STRIG(0) will tell you if either of the buttons have been pressed.

If STRIG(0) returns a zero then the button has been pressed and a one indicates no action.

You can work out the direction from the following table:

Value returned	Direction
14	UP
13	DOWN
11	LEFT
7	RIGHT
10	UP/LEFT
6	UP/RIGHT
9	DOWN/LEFT
5	DOWN/RIGHT
15	NO MOVEMENT

Revised opinion

I HAVE a 800XL with revision B Basic and the guarantee has expired. I have been trying to buy a revision C cartridge for some time without success. Could you please tell me where I might purchase one and the cost of it?

I have typed in Dots from the January 1986 issue of Atari User *and have used Get It Right! to check it. Everything seems OK and a friend has also checked it for me, but I keep getting an error 9 at line 5. Is this something to do with revision B Basic?*

Also, is there any way I can stop Get It Right! from changing colours other than by using Control+1? The last line of checksum also disappears too quickly for me to check it. – **S.D. Sargun, Hastings.**

● For a Rev. C cartridge, try Silica Shop or Software Express – they cost about £9.95.

The error 9 could well be caused by the Rev. B problem, as DIM is one of the commands that shows up the bugs.

If you want to stop Get It Right! from cycling thorugh the colours, simply add line 101 as:

```
101 POKE 77,0
```

The last line will not disappear if you haven't pressed any keys since the current checksum was started – assuming you are using the updated August 1986 version, of course.

Loading cassettes

I HAVE recently bought a 1050 disc drive and an Atari 800XL. Is it possible to use a normal cassette recorder to load cassette games, or must I buy the special Atari data recorder?

Also, could you tell me how to use the COLOR command in different graphics modes? I have tried using this command in various modes, but it doesn't seem to display the number of colour mentioned in the manual.

For example, the manual says that mode 9 should have only one colour, but the COLOR command displays 16! How does the SETCOLOR command work, as it is not very well explained in the manual?

Lastly, is it possible to have more than one graphics mode on the screen at the same time? – **Francis Sreeves, Alcester.**

● Firstly, you will indeed need an Atari recorder for use with your computer, or a special adapter which is nearly the same price anyway.

The COLOR and SETCOLOR commands in Atari Basic are quite powerful. In mode 9 you have only one colour available, but 16 brightness levels. Thus, COLOR specifies the various brightness scales in this particular case.

For more information on mixing graphics modes see our series on Display Lists in the July to December 1985 issues.

PEN PALS

Jim, Toumpanakis Dimitris, Pericleous 5, Kato Akarnai 13677, Athens, Greece would like to hear from English pen pals. And Fred Swanevelt, 169 Alton Drive, Beaconsfield PQ, Canada H9W 221 is especially interested in hearing from Dutch Atari owners.

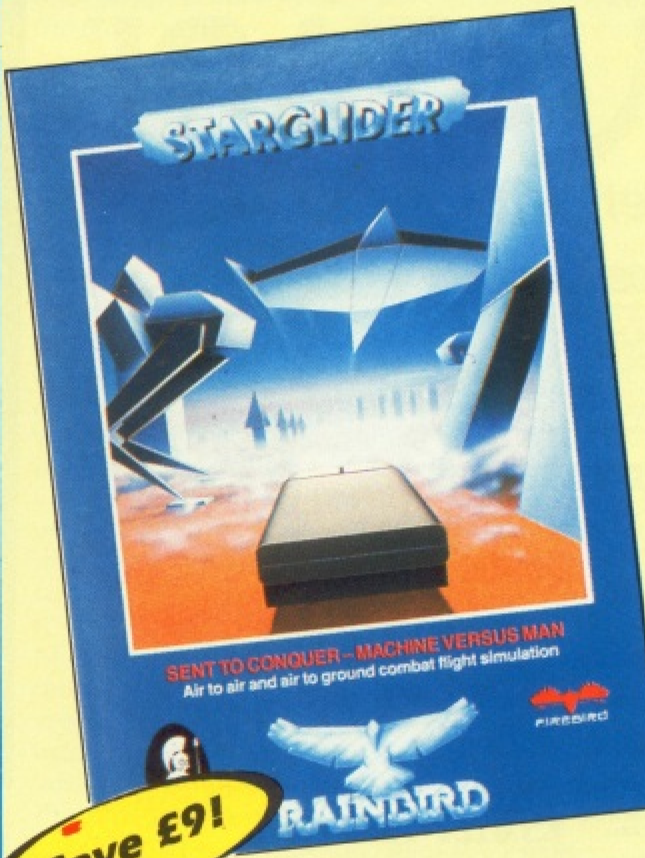
Mercenary compendium

I AM interested in your special reader offer in the February 1987 Atari User *for the complete Mercenary compendium, but the "suit able for" box states Atari XE/XL.*

The question is will Mercenary run on my 48k Atari 800 – something I would like to know before I order a compendium from you. – **Peter Boulter.**

● There are two versions of Mercenary which come on the disc or tape. One is for 48k machines, and will therefore work fine on your 800, and one is an enlarged version which has extra features and operates in 64k.

ATARI USER MAIL ORDER OFFERS

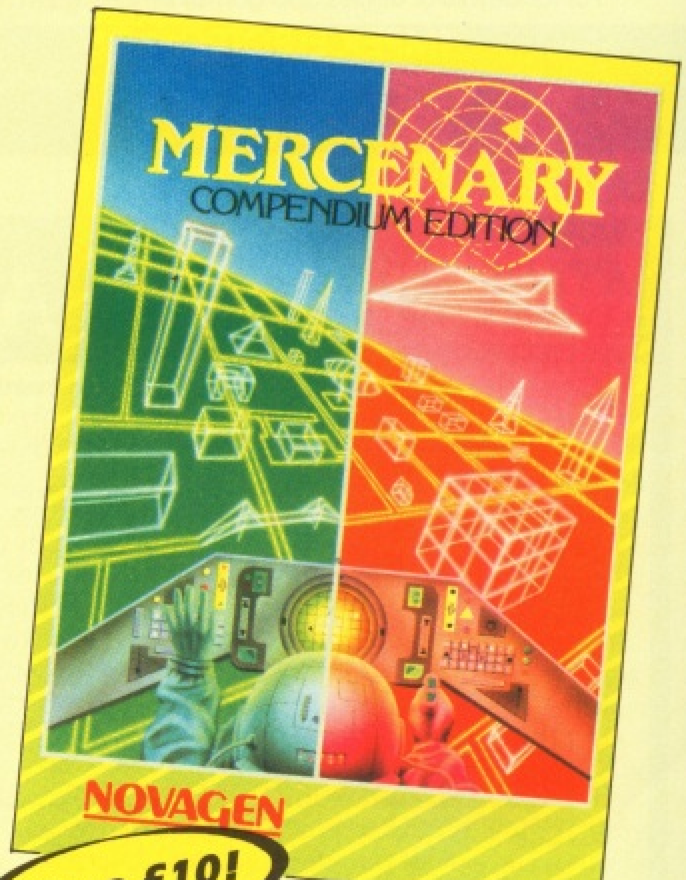


More EXCLUSIVE special offers – plus even BIGGER savings for Atari User subscribers!

Starglider is "simply the best arcade game seen on any 68000 based machine" *(Popular Computing Weekly)*.

It's the first ever game to feature stunning, fully animated vector graphics – and the first to include high-quality digitised sound . . . even messages from the ship's computer throughout your hair-raising flight are in digitised speech! Thrill to low-level flying, exhilarating defence and attack manoeuvres – it's all here, and much, much more!

The package includes a 64-page novel that sets the scene – and gives you vital information to help you succeed in your quest!



Now – the COMPLETE Mercenary Compendium

Here's all you need to get the last ounce of fun and excitement out of one of the most talked-about games of 1986. This is what this package contains:

Escape from Targ. A unique combination of flight simulation, adventure and arcade action, PLUS high speed 3D vector graphics! You crash-land on planet Targ's Central City and you have but one aim – to escape!

Targ Survival Kit. For help when you need it most. Includes maps of Central City and its subterranean complexes. And a novelette, "Interlude on Targ", with more hints and tips.

The Second City. Thought you'd got away? Then load in this extra data set and think again! No hints or clues this time – you're on your own!

Suitable for	Product	Format	RRP	Special reader offer	YOU SAVE	Offer including subscription	YOU SAVE
Atari ST	Starglider	Disc	£24.95	£21.95	£3	£27.95	£9
Atari XE/XL*	Mercenary Compendium	Tape	£14.95	£12.95	£2	£17.95	£9
Atari XE/XL*	Mercenary Compendium	Disc	£17.95	£14.95	£3	£19.95	£10
Atari ST	Mercenary Compendium	Disc	£24.95	£21.95	£3	£26.95	£10

To order turn to the Form on Page 53

ATARI USER MAIL ORDER OFFERS

This is the game you'll want to play . . . and play . . . and play . . .

(And with 3,000+ questions, it'll keep you happy for months!)



Trivial Pursuit™

Only for the Atari 400/800XL, 130XE

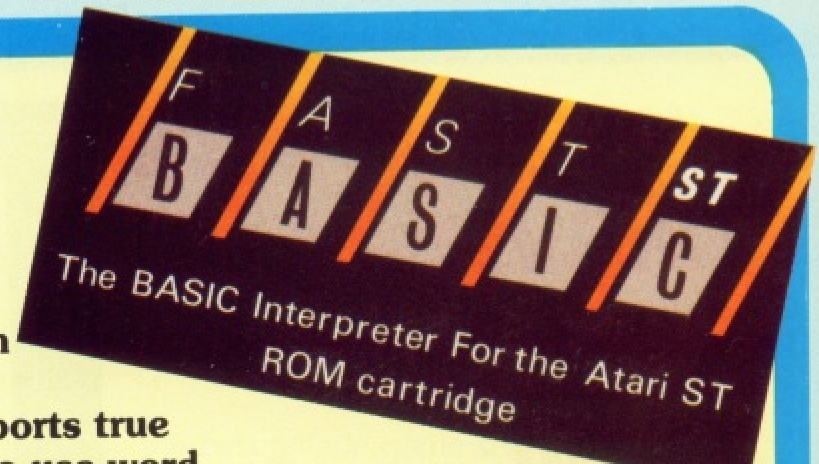


At last – the world's most fashionable board game comes alive on your Atari. And it makes the most of the Atari's sound and graphics to take on an entirely new dimension. Now it can ask you to Name that Tune. Easy? Not when it's played backwards!
Order through this special offer and you'll save £2 off the recommended retail price. Take out a subscription at the same time and save £5.

Suitable for	Product	Format	RRP	Special reader offer	YOU SAVE	Offer including subscription	YOU SAVE
Atari XL/XE	Trivial Pursuit GENUS EDITION	Tape	£14.95	£12.95	£2	£21.95	£5
Atari XL/XE	Trivial Pursuit GENUS EDITIO	Disc	£19.95	£17.95	£2	£26.95	£5

To order turn to the Form on Page 53

Exploit the POWER of your Atari ST to the full, with . . .



Fast ST Basic is a totally new implementation of Basic for the Atari ST range. Running faster than almost all other languages, it supports true structured programming. And it has an easy-to-use word processor-like editor that makes full use of Gem. Up to 10 separate programs can be held in memory at once – each with its own editing window. There's even a built-in 68000 assembler to let you harness the power of your ST at machine level. And if you order through *Atari User* you'll save £10!

Look at the speed of Fast Basic compared to other popular Basics, using average PCW benchmarks:

FAST ST BASIC	**1.9**
IBM AT	6.8
BBC B	14.8
AMSTRAD	14.7
SINCLAIR QL	15.6
IBM PC	16.8
COMMODORE 128	40.1
SPECTRUM	54.8

Fast ST Basic is compatible with all versions of the 520 and 1040 ST.

WHAT YOU GET: **A rom cartridge that simply plugs into the side of your ST, a fully detailed 380 page manual, a quick reference card listing all keywords and parameters, and a disc containing many example programs that demonstrate all aspects of Fast Basic from simple loops to full blown Gem programs.**

RRP £89.90

ATARI USER ***READER OFFER***

£79.90

SAVE £10

9 useful functions that are ALWAYS available when you are using your Atari ST.

Back-Pack is a versatile desk accessory on rom. It sits in the background while other application programs are running, but can be called up and used at any time. It contains:

Scientific Calculator: Click on the numbers with the mouse or use the numeric keypad to access a large range of scientific functions.
Clock and Alarms: Tell the time with an analogue or digital display. Use the alarms to ring or display a dialogue box.
Diary: Open a page to show a whole day's events. Unique classification feature enables you to search for similar category events.
Notepad: Access up to 31 pages of notes, any of which can be transferred into the application.
Typewriter: Use it to send codes and short messages to the printer while working on other programs.
Printer Buffer: Put aside any amount of the ST's ram as a buffer, allowing long documents to be printed while the computer is still in use.
Address Book: Gives you simple and fast access to names, addresses and other details which can then be used in other programs.
Mini Clock: Place a digital clock anywhere on the desktop.
Ramdisk: Set aside any amount of ram as a Ramdisk, to act like an ultra-fast disc drive. Speeds up any program that normally uses discs.



RRP £49

ATARI USER ***READER OFFER***

£39

SAVE £10

ORDER FORM • ORDER FORM • ORDER FORM • ORDER FORM

ATARI USER

Atari ST User

All prices include postage, packing and VAT — **Valid to March 31, 1987** — Overseas orders despatched by Airmail.

ATARI USER

Annual subscription

		Price	Code	(✓)	£ p
New	UK & EIRE (sterling only)	£12	*7001*		
	Europe	£15	*7003*		
	Overseas (Airmail)	£30	*7004*		

Commence with ______________ issue

		Price	Code	(✓)	£ p
Renewal	UK & EIRE (sterling only)	£12	*7002*		
	Europe	£15	*7701*		
	Overseas Airmail	£30	*7702*		

Back Issues

£1.25 UK & Eire
£1.75 Europe
£3.25 Overseas

Issue	Code		Issue	Code	
1986 Mar	*7015*		Sept	*7405*	
Apr	*7016*		Oct	*7406*	
May	*7401*		Nov	*7407*	
June	*7402*		Dec	*7408*	
July	*7403*		1987 Jan	*7409*	
Aug	*7404*		Feb	*7410*	

Back Issue Magazine Bundle

£4.90 UK
£5.90 Europe
£13.90 Overseas Airmail

May 1985 -Nov 1985 *7032*

Trivial Pursuit

		With sub *	Without sub	Code
Atari XE/XL	Tape	£9.95	£12.95	*7089/7090*
	Disc	£14.95	£17.95	*7091/7092*

* Only if accompanied by a subscription order or renewal
Add £2 for Europe/£4 for Overseas

Mercenary Compendium

		With sub *	Without sub	Code
Atari XE/XL	Tape	£5.95	£12.95	*7083/7084*
	Disc	£7.95	£14.95	*7085/7086*

* Only if accompanied by a subscription order or renewal
Add £2 for Europe/£4 for Overseas

Dust Cover

£3.95 UK
£4.95 Europe/Overseas

130XE *7031*
800XL *7060*

Binder

£3.95 UK; £5.95 Europe; £10.95 Overseas Airmail *7029*

TOTAL ______

Atari ST User

Annual subscription

		Price	Code	(✓)	£ p
New	UK & EIRE (sterling only)	£12	*9100*		
	Europe	£15	*9101*		
	Overseas (Airmail)	£30	*9102*		

Commence with ______________ issue

		Price	Code	(✓)	£ p
Renewal *	UK & EIRE (sterling only)	£12	*9103*		
	Europe	£15	*9104*		
	Overseas Airmail	£30	*9105*		

** To be used if your subscription to Atari User is about to expire and you wish to transfer to Atari ST User*

Starglider

With sub *	Without sub	Code
£15.95	£21.95	*9110/9111*

* Only if accompanied by a subscription order or renewal
Add £2 for Europe/£4 for Overseas

Fast ST Basic

Rom cartridge
£79.90 UK
£82.90 Europe
£85.90 Overseas Airmail *9112*

Back-Pack

Rom cartridge
£39 UK
£44 Europe
£56 Overseas Airmail *9113*

Mercenary Compendium

	With sub *	Without sub	Code
Atari ST	£14.95	£21.95	*9114/9115*

* Only if accompanied by a subscription order or renewal
Add £2 for Europe/£4 for Overseas

Dust Cover

£3.95 UK
£4.95 Europe/Overseas

520ST range *9116*
1040ST range *9117*

Binder

£3.95 UK; £5.95 Europe; £10.95 Overseas Airmail *9118*

TOTAL ______

Send to: *Database Publications*, **FREEPOST, Europa House, 68 Chester Road, Hazel Grove, Stockport SK7 5NY.**

(No stamp needed if posted in UK) *Please allow 28 days for delivery*

Order at any time of the day or night

Telephone Orders:	*Orders by Prestel:*	*MicroLink/Telecom Gold*
061-429 7931	**Key *89, then 614568383**	**72:MAG001**

Don't forget to give your name, address and credit card number

ENQUIRIES ONLY: 061-480 0171 9am-5pm

Payment: please indicate method (✓)

Access/Mastercard/Eurocard/Barclaycard/Visa — Expiry Date ___ / ___

No. ____ ____ ____ ____

Cheque/Eurocheque made payable to Database Publications Ltd.

Name ______________ Signed ______________

Address ______________

______________ Post Code ______________

Tel ______________

AT3

CHIPS — ATARI SPECIALISTS

WE BUY, SELL, PART EXCHANGE

ALL TYPES OF COMPUTER EQUIPMENT

THE LOWEST PRICES POSSIBLE

XL, XE RANGE ALL IN STOCK

RING US LAST FOR THE BEST QUOTE

WE ARE NOW OFFICIALLY APPOINTED ATARI DEALERS
All ST range in stock including 1040 ST.
Also memory upgrades available.

CHIPS COMPUTER CENTRE
53 RUGBY ROAD, WORTHING, SUSSEX BN11 5NB.
NEW BULLETIN BOARD SERVICE
300 Baud Ring Back. Tel: (0903) 503711 – 24 hours
TEL: (0903) 40509 (24 hours)

ADVERTISERS INDEX

CUT PRICE SOFTWARE

AT ST SOFTWARE	RRP	OUR
Silicon Dream	24.95	19.99
Jewels of Dark	24.95	19.99
Protector	19.95	17.95
ST Karate	24.95	19.95
Championship Wrestling	24.95	19.99
Spiderman	24.95	19.99
Leaderboard Tournament	9.99	7.99
Sundog	29.99	24.99
The Pawn	24.99	19.99
Leaderboard	24.99	19.99
Ninja Mission	9.95	7.95
World Games	24.99	19.99
Little Computer People	34.99	29.99
Gauntlet	24.95	19.99
Starglider	24.99	19.99
Winter Games	24.99	19.99
Silent Service	24.99	19.99
Deep Space	29.95	24.95
Alternate Reality	29.95	25.95
Arena	29.95	24.95

ATARI 800 TOP 20 TITLES		CASS	DISC
(1)	Leaderboard	7.25	11.95
(2)	Sunstar	6.50	10.00
(3)	Hardball	7.25	11.95
(4)	Trivial Pursuit	11.95	17.95
(5)	International Karate	6.50	10.95
(6)	Smash Hits 6	7.25	11.95
(7)	Ninja	2.50	N/A
(8)	Fighter Pilot	7.25	11.95
(9)	Tomahawk	7.25	11.95
(10)	Steve Davis Snooker	7.25	N/A
(11)	Mercenary	7.25	11.95
(12)	Price of Magick	7.25	N/A
(13)	Solo Flight 2	7.25	11.95
(14)	Jewels of Darkness	11.95	14.95
(15)	Second City	6.50	10.00
(16)	Decathlon	7.25	N/A
(17)	Spy V Spy	7.25	N/A
(18)	Football Manager	7.25	N/A
(19)	Atari Hits 1	7.25	N/A
(20)	Fight Night	7.25	N/A

(Coming soon on Atari 800XL Silent Service Cass £7.25 Disk £11.95)
This is just a small selection from our stock, Mail order prices only, PP inc, Overseas orders please add 75p per tape. Please make cheques payable to C.P.S. Visa and Access orders welcome by phone.

CUT PRICE SOFTWARE (Dept 5) Unit 6, Stort House,
Riverway, Harlow, Essex, CM20 2DW
Tel: (0279) 24433 (24 Hr. Answerphone) or 31956 During office hours.

VISA

ATARI 400/800/XL/XE UTILITIES

DISK-TO-DISK UTILITY – Features include: a versatile SECTOR COPIER. DISK MAPPER to locate Bad-Sectors. BAD-SECTOR CREATOR – enables you to write Bad-Sectors to a disk. Backs-Up disks protected with Bad-Sectors. **DISK £14.95 inc. P&P**

TAPE-TO-DISK UTILITY – Transfers Single-Load commercial tapes to disk. N.B. not suitable for Multi-Load tapes. **TAPE £9.95 inc. P&P**

MENULOADER – If used in conjunction with our Tape-to-Disk utility up to TEN transferred programs can be placed onto ONE disk and selected from a Menu Screen. **DISK £12.95 inc. P&P**

TAPE-TO-TAPE UTILITY – Single and Multi-Load Tape Back-Up utility. **TAPE £8.95 inc. P&P**

TURBOCHARGER XL/XE – As our Tape-to-Tape utility PLUS option to save-to-tape at an increased Baud rate and create TURBOLOAD tapes. **TAPE £9.95 inc. P&P**

BINARY TAPE EDITOR – Single and Multi-Load tape Back-Up PLUS an onboard Editor that will reveal, and allow you to alter text in commercial programs. Search Adventure tapes for clues and locations – 'spice-up' the text. **TAPE £9.95 inc. P&P**

THE CASSETTE DUPLICATOR – A Tape-Copier written in Basic – can be LISTed. **TAPE £8.95 inc. P&P**

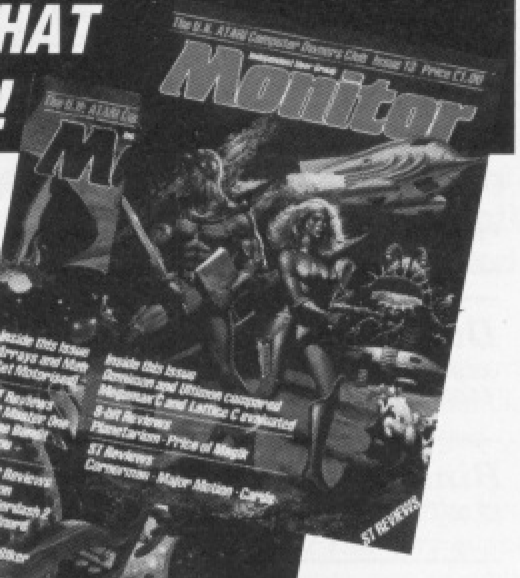
SECTOR INSPECTOR – Dump any sector of a disk to screen – search Adventure disks for clues etc. Use the Editor to alter text. Integral Instructions. **DISK £8.95 inc. P&P**

SOFT SHAPER – An Antic 4/5 (GRAPHICS 12/13) character redefinition utility. Create Multi-Coloured character sets for use in your own programs. **TAPE £3.95 inc. P&P DISK £4.95 inc. P&P**

FREE OFFER – Original Machine-Code game with all orders over £20. State Tape or Disk. All software is supplied with full instructions. With the exception of the Cassette Duplicator, all software is 100% Machine-Code. Enquiries should include a S.A.E. Overseas customers please add £2 to total order.

Cheques and P.O's to:
K.E. DAVIS, 10 Ingram Avenue, Holmer, Hereford HR4 9RD

ARE YOU MISSING OUT? MONITOR MAGAZINE IS JUST WHAT YOU NEED!



Filled from cover to cover with:

- ***Galvanising Games***
- ***Tantalising Tutorials***
- ***Mind-boggling Machine Code***
- ***Lotsa Listings***
- ***Topical Tips***
- ***Realistic Reviews***
- ***16-Bit and 8-Bit Coverage***

Send a cheque/P.O. for £4-00, made payable to the 'U.K. Atari Computer Owners Club', for your four issues subscription now. Or send £1-30p (which includes P&P) for a sample copy, to see what the magazine offers.

Don't delay do it today!!

THE U.K. ATARI COMPUTER OWNERS CLUB
AT3 **P.O. Box 3, Rayleigh, Essex, SS6 8LR**
Independent User Group

PROM PROGRAMMER

Universal model programs 2732 (21v and 25v), 2764, 27128 and 27256 (21V and 12.5V). Fast programming algorithm on 2764 and above. Commands to read, program, verify, checksum, check empty, save to and recall from disc and to examine and edit the contents of proms. £90.00. UV eraser £30.00.

CENTRONICS PRINTER INTERFACE

Buffered printer interface works with all known word processors etc. The buffer frees you to get on with other work as well as actually speeding up the printing process. Available in three buffer sizes 7K £69.00, 15K £79.00 and 23K £89.00 (7K is about enough for 3 pages).

NEW FAST LOADER

Reduce the loading time of nearly all of your tapes by re-recording them at a faster data rate (up to 52% faster). Totally new significantly enhanced program. £9.00.

HARDWARE UTILITIES

Blank cartridge boards (normal and bank switched), cartridge simulators and other utility boards also available.
Prices fully inclusive. All products suitable for the 800/XL/XE range. Send SAE for further details.

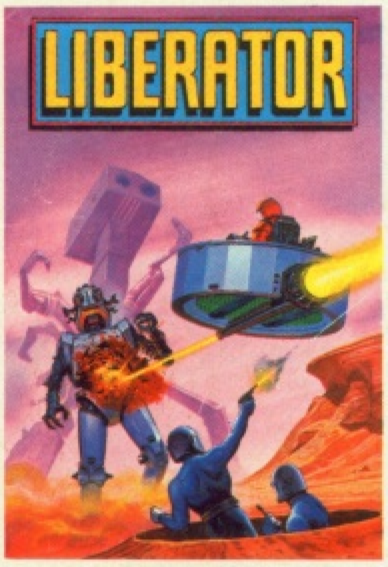
S. TERRELL
17 Cock Close Road, Yaxley, Peterborough PE7 3HJ.

ATARI 1050 DISK DRIVE WRITE PROTECT UTILITY

Use B side of disk without notching. Ignores existing notches if required.
Red and Green LED's for Write or Not-Write. Simply plugs in with no soldering or modifications required.
Full instructions included.

GREAT VALUE AT £6.95 inc. p&p.

Cheque or P.O. to
R. CROWTHER, 138 ALNWICK ROAD,
SHEFFIELD S12 2GH



LIBERATOR (ST COLOUR)

Battle through the solar system, from planet to planet, liberating the imprisoned Federation Members from the aliens evil clutches.

NEW RELEASE

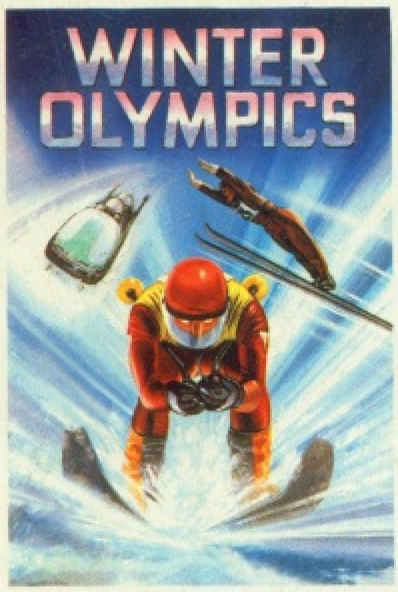
ST DISK £12.95



TIME BLAST (ST COLOUR)

A highly enhanced Arcade Classic. Guide your Jet Copter over mountainous enemy terrain avoiding ground-to-air missiles, MT-Refractor beams, Delta Ships and many more hazards.
Nine levels of Arcade Action

ST DISK £9.95



WINTER OLYMPICS (ATARI 8 BIT)

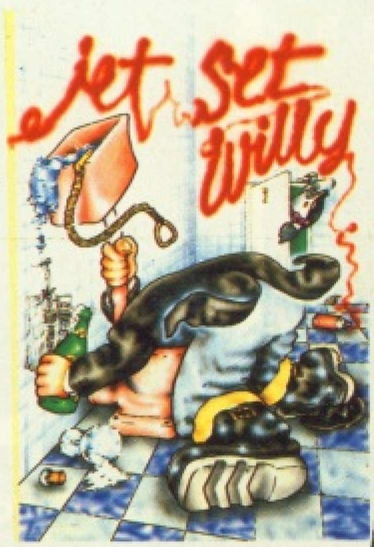
This superb Winter Sports simulation with incredible detailed graphics allows you to compete against the computer and the clock in 5 challenging sports events - Speed Skating * Ski Slalom * Ski Jump *Ski Downhill * Cresta Run.

CASS £7.95
DISK £9.95

JET SET WILLY I (ATARI 8 BIT)

An all time Classic game now carefully enhanced for the Atari computer.
Help Willy to explore and collect items in his cliff top mansion.

CASS £7.95
DISK £9.95



TYNESOFT
COMPUTER SOFTWARE



SCREEN SHOTS FROM VARIOUS COMPUTERS

Tynesoft Computer Software, Addison Industrial Estate, Blaydon, Tyne & Wear NE21 4TE. Tel: (091) 414 4611